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Vol. 970 Number 4

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

May 23, 1978

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OFFICIAL GAZETTE of the
UNITED STATES PATENT and TRADEMARK OFFICE

May 23, 1978 Volume 970 Number 4

CONTENTS

	Page
Patent and Trademark Notices	
Practice/Re: New Grounds of Rejection After Appeal Brief Has Been Filed	970 OG 94
Patent Cooperation Treaty Information	970 OG 94
Reissue Applications Filed	970 OG 94
Patent Notices	
Certificates of Correction for the Week of May 23, 1978	970 OG 96
Disclaimers	970 OG 96
Disclaimer and Dedication	970 OG 96
Condition of Patent Applications	970 OG 97
Reissue Patents Granted (29,635)	1189
Patents Granted	
General and Mechanical (4,090,264)	1193
Chemical (4,090,844)	1389
Electrical (4,091,228)	1495
Design Patents Granted (247,931)	1577
Index of Patentees	PI 1
Indices of Reissues and Designs	PI 41
Classification of	
Patents (Including Reissues)	PI 43
Designs	PI 45
Geographical Index of Residence of Inventors	
Patents (Including Reissues)	PI 46
Designs	PI 47
Change of Address Form and Subscription Order Form	Back Page

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PATENT AND TRADEMARK OFFICE NOTICES

Practice/Re: New Grounds of Rejection After Appeal Brief Has Been Filed

A new practice has been implemented in the Patent Examining Corps to promote uniformity and adherence to guidelines in situations where a new ground of rejection is made in an Office action after an appeal brief has been filed. Under this practice Supervisory Patent Examiner approval is required for any new ground of rejection made after the filing of an Appeal Brief. This requirement extends to new grounds of rejection made either in an examiner's answer or in an Office action reopening prosecution. Evidence of that approval should appear on applicant's copy of the Office action or answer as well as the record copy. Consultation with or approval by the Group Director is no longer required in these situations.

This new practice does not alter the existing guidelines for reopening prosecution (MPEP) 706.7(e)) or for making a new ground of rejection in an examiner's answer (MPEP 1208.01). Appropriate modifications will be made to applicable Sections of the Manual of Patent Examining Procedure in a future revision.

WILLIAM FELDMAN,
Deputy Assistant Commissioner for Patents.

Patent Cooperation Treaty Information

For information concerning the PCT including the amounts of the fees thereunder and the States that may be designated in International applications consult the Notice entitled "Patent Cooperation Treaty (PCT) Implementation: Information for Prospective Applicants" appearing in the OFFICIAL GAZETTE of May 16, 1978.

May 2, 1978.

LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks.

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,403,180, Re. S.N. 877,929, Filed Feb. 15, 1978, Cl. 260/577, 4-TRIFLUOROMETHYL-2,6-DINITROANILINES, Quentin F. Soper, Owner of Record: *Eli Lilly and Company, Indianapolis, Ind.,* Attorney or Agent: Arthur R. Whale, et al., Ex. Gp.: 117

3,403,180, Re. S.N. 877,930, Filed Feb. 15, 1978, Cl. 260/577, 4-TRIFLUOROMETHYL-2,6-DINITROANILINES, Quentin F. Soper, Owner of Record: *Eli Lilly and Company, Indianapolis, Ind.,* Attorney or Agent: Arthur R. Whale, et al., Ex. Gp.: 117

3,736,315, Re. S.N. 890,779, Filed Mar. 27, 1978, Cl. 260/239 BD, 1-(3,4-DIMETHOXY-PHENYL-4-METHYL-5 ETHYL-7,8-DIMETHOXY-5H-2,3,-BENZODIAZEPINE, Jeno Korosi, et al., Owner of Record: *Egyt Gyogyszerveszeti Gyar, Budapest, Hungary,* Attorney or Agent: H. Walter Haeussler, et al., Ex. Gp.: 121

3,910,284, Re. S.N. 889,168, Filed Mar. 23, 1978, Cl. 128/355, METHOD OF TREATING HUMAN SKIN, Norman Orentreich, Owner of Record: *Inventor,* Attorney or Agent: Arthur H. Seidel, et al., Ex. Gp.: 335

3,925,680, Re. S.N. 878,184, Filed Feb. 14, 1978, Cl. 307/39, METHOD AND SYSTEM FOR REGULATING PEAK RESIDENTIAL POWER DEMAND, William A. Dixon, Owner of Record: *Wattmiser Incorporated, St. Simons Island, Ga.,* Attorney or Agent: Frederick G. Michaud, Jr., Ex. Gp.: 217

3,932,105, Re. S.N. 869,159, Filed Jan. 13, 1978, Cl. 425/504, APPARATUS FOR LINING CARTONS, Lawrence H. Knoell, Owner of Record: *Hoerner Waldorf Corporation, Ramsey, Minn.,* Attorney or Agent: Evelyn M. Sommer, Ex. Gp.: 322

3,940,293, Re. S.N. 879,314, Filed Feb. 21, 1978, Cl. 148/11.5 F, METHOD OF PRODUCING AMORPHOUS CUTTING BLADES, Donald E. Polk, et al., Owner of Record: *Allied Chemical Corporation, New York, N.Y.,* Attorney or Agent: Gerhard H. Fuchs, et al., Ex. Gp.: 111

3,941,752, Re. S.N. 880,866, Filed Feb. 23, 1978, Cl. 260/75 P, FLAME RETARDING LINEAR POLYESTERS AND SHAPED ARTICLES THEREOF, Hans-Jerg Kleiner, et al., Owner of Record: *Hoechst Aktiengesellschaft, Frankfurt am Main, Germany,* Attorney or Agent: Henry W. Koster, et al., Ex. Gp.: 143

3,947,865, Re. S.N. 891,164, Filed Mar. 28, 1978, Cl. 357/46, COLLECTOR-UP SEMICONDUCTOR CIRCUIT STRUCTURE FOR BINARY LOGIC, Lewis K. Russell, Owner of Record: *Signetics Corporation, Sunnyvale, Calif.,* Attorney or Agent: Frank R. Trifari, et al., Ex. Gp.: 254

3,951,865, Re. S.N. 890,865, Filed Mar. 20, 1978, Cl. 252/457, CATALYTIC PURIFIER UNIT, Per G. Norback, Owner of Record: *Aktiebolaget Carl Munters, Sollentuna, Sweden,* Attorney or Agent: Eric Y. Munson, Ex. Gp.: 116

3,963,549, Re. S.N. 884,775, Filed Mar. 8, 1978, Cl. 156/193, METHOD AND APPARATUS FOR PRODUCING CONTINUOUS SURFACE ELEMENTS, Max Otto Henri Rasmussen, Owner of Record: *Heikki S. Suominen, Tampere, Finland,* Attorney or Agent: Elliott I. Pollock, et al., Ex. Gp.: 161

3,975,489, Re. S.N. 889,993, Filed Mar. 24, 1978, Cl. 264/222, CAST EJECTOR, Roger W. Mercer, Owner of Record: *Inventor,* Attorney or Agent: Joseph E. Rusz, et al., Ex. Gp.: 147

3,976,033, Re. S.N. 890,553, Filed Mar. 20, 1978, Cl. 122/7 R, VERTICAL FIRETUBE WASTE HEAT BOILER, Denis G. Csathy, et al., Owner of Record: *Deltak Corporation, Minneapolis, Minn.,* Attorney or Agent: Ira Milton Jones, et al., Ex. Gp.: 344

3,990,297, Re. S.N. 889,623, Filed Mar. 23, 1978, Cl. 73/152, PROCESS AND DEVICE FOR THE DETERMINATION OF THE CHARACTERISTICS OF THE GEOLOGICAL FORMATIONS TRAVERSED BY A BOREHOLE, Regis Pelet, et al., Owner of Record: *Institut Francais du Petrole, Rueil-Malmaison, France,* Attorney or Agent: Paul M. Craig, Jr., et al., Ex. Gp.: 244

4,000,087, Re. S.N. 891,324, Filed Mar. 29, 1978, Cl. 252/316, MICROCAPSULES USEFUL IN CARBONLESS COPYING SYSTEMS AND PROCESS FOR THEIR PREPARATION, George E. Maalouf, Owner of Record: *Moore Business Forms, Inc., Niagara Falls, N.Y.,* Attorney or Agent: James H. Marsh, Jr., Ex. Gp.: 223

4,019,554, Re. S.N. 884,774, Filed Mar. 8, 1978, Cl. 160/84 R, THERMAL INSULATING CURTAIN, ESPECIALLY FOR USE IN GREENHOUSES, Max Otto Henri Rasmussen, Owner of Record: *Heikki S. Suominen, Tampere, Finland,* Attorney or Agent: Elliott I. Pollock, et al., Ex. Gp.: 351

4,061,115, Re. S.N. 889,145, Filed Mar. 22, 1978, Cl. 123/90.16, VALVE TRAIN FOR INTERNAL COMBUSTION ENGINE, Wilfred F. Predhome, Jr., Owner of Record: *Inventor,* Attorney or Agent: Philip H. Sheridan, et al., Ex. Gp.: 342

4,064,568, Re. S.N. 890,858, Filed Mar. 27, 1978, Cl. 3/1.911, KNEE-JOINT ENDOPROSTHESIS, Hans Grundei, et al., Owner of Record: *Sanitatshaus Schutt & Grundei, Lubeck, Germany,* Attorney or Agent: James B. Kinzer, et al., Ex. Gp.: 337

4,074,275, Re. S.N. 890,857, Filed Mar. 20, 1978, Cl. 346/19, STRIP CHART RECORDER, John C. Stires III, Owner of Record: *Inventor,* Attorney or Agent: Carl R. Brown, et al., Ex. Gp.: 211

PATENT NOTICES

Certificates of Correction for the Week of May 23, 1978

Re. 29,225	4,038,239	4,057,827	4,067,650
Re. 29,430	4,038,529	4,058,493	4,067,691
Re. 29,460	4,039,705	4,058,554	4,067,822
Re. 29,480	4,041,469	4,058,571	4,067,828
Re. 29,505	4,041,690	4,058,825	4,067,852
D. 247,027	4,043,689	4,058,967	4,067,866
3,567,973	4,044,015	4,058,977	4,067,878
3,585,363	4,044,097	4,059,120	4,067,984
3,615,438	4,044,240	4,059,286	4,068,028
3,700,740	4,045,471	4,059,431	4,068,072
3,761,095	4,045,838	4,059,561	4,068,197
3,792,845	4,045,956	4,059,619	4,068,271
3,842,776	4,046,281	4,059,697	4,068,354
3,869,601	4,046,313	4,059,728	4,068,409
3,871,381	4,046,527	4,060,149	4,068,461
3,887,730	4,046,651	4,060,248	4,068,521
3,925,646	4,047,093	4,060,407	4,068,741
3,927,303	4,047,875	4,060,448	4,068,778
3,936,409	4,048,654	4,060,513	4,068,985
3,939,566	4,048,783	4,060,915	4,069,140
3,946,100	4,049,521	4,060,978	4,069,161
3,946,654	4,049,643	4,061,245	4,069,289
3,957,843	4,049,675	4,061,497	4,069,469
3,965,206	4,049,769	4,062,070	4,069,493
3,978,102	4,049,992	4,062,278	4,069,545
3,979,438	4,050,225	4,062,485	4,069,673
3,981,236	4,050,648	4,062,932	4,069,722
3,982,942	4,051,022	4,063,075	4,070,121
3,992,161	4,051,238	4,063,263	4,070,132
3,995,532	4,051,246	4,063,331	4,070,160
3,996,672	4,051,287	4,063,611	4,070,282
3,997,137	4,051,687	4,063,618	4,070,298
4,004,109	4,051,693	4,063,657	4,070,523
4,009,589	4,052,077	4,063,778	4,070,632
4,009,590	4,052,420	4,064,062	4,070,644
4,010,257	4,052,468	4,064,113	4,070,714
4,014,489	4,052,470	4,064,502	4,071,095
4,017,197	4,052,755	4,064,792	4,071,235
4,017,385	4,052,845	4,064,915	4,071,274
4,023,439	4,053,189	4,065,112	4,071,392
4,024,163	4,053,254	4,065,485	4,071,700
4,025,516	4,053,264	4,065,614	4,071,905
4,025,842	4,053,498	4,065,637	4,072,312
4,028,562	4,054,616	4,065,662	4,072,346
4,028,695	4,054,759	4,065,681	4,072,626
4,030,184	4,055,107	4,065,712	4,072,633
4,030,224	4,055,609	4,065,751	4,072,670
4,030,536	4,055,812	4,065,753	4,072,720
4,030,589	4,056,269	4,065,754	4,072,783
4,030,668	4,056,555	4,065,756	4,072,986
4,031,083	4,056,832	4,065,804	4,073,306
4,032,777	4,057,086	4,066,122	4,073,824
4,032,912	4,057,363	4,066,432	4,074,141
4,035,771	4,057,380	4,066,787	4,074,897
4,036,249	4,057,469	4,067,195	4,075,133
4,036,835	4,057,574	4,067,240	4,075,545
4,038,169	4,057,641	4,067,511	4,075,689

Disclaimers

3,005,282.—*Godtfred Kirk Christiansen*, Billund, Denmark. TOY BUILDING BRICK. Patent dated Oct. 24, 1961. Disclaimer filed Mar. 31, 1978, by the assignee, *Interlego A.G.*

Hereby enters this disclaimer to claims 1, 2 and 3 of said patent.

3,034,254.—*Godtfred Kirk Christiansen*, Billund, Denmark. TOY BUILDING SETS AND BUILDING BLOCKS. Patent dated May 15, 1962. Disclaimer filed Mar. 31, 1978, by the assignee, *Interlego A.G.*

Hereby enters this disclaimer to claims 1, 2, 3, 4 and 5 of said patent.

3,737,165.—*Gierdius Pencyla*, Oak Park, Ill. SHOOTING RANGE BULLET TRAP STRUCTURE. Patent dated June 5, 1973. Disclaimer filed Sept. 2, 1977, by the assignee, *Korhumel Industries, Inc.*

Hereby enters this disclaimer to claims 1, 4, 5, 7, 8, 9, 10, 11, 12, 17, 18, 19, 26, 27 and 28 of said patent.

3,952,606.—*Gunter W. Schulz*, Peoria, Ill. MARINE GEAR ASSEMBLY. Patent dated Apr. 27, 1976. Disclaimer filed Mar. 30, 1978, by the assignee, *Caterpillar Tractor Co.*

Hereby enters this disclaimer to claims 1–6 and claim 8 of said patent.

4,036,103.—*Heinz Gaiclick*, Vagen Post Feldkirchen-Westerham, *Horst Rammensee*, Nurnberg, *Karl Mack*, Ansbach, and *Fritz Schneider*, Burgbernheim, Germany, MAGAZINE APPARATUS FOR PROPELLANT CHARGES AND METHODS OF MAKING SAME. Patent dated July 19, 1977. Disclaimer filed Mar. 14, 1978, by the assignee, *Dynamit Nobel Aktiengesellschaft and Impex-Essen Vertrieb Von Werkzeugen GmbH.*

Hereby enter this disclaimer to the entire term of said patent.

4,052,662.—*Rama N. Rau*, Danbury, Conn. METHOD AND APPARATUS FOR INVESTIGATING EARTH FORMATIONS UTILIZING MICROWAVE ELECTROMAGNETIC ENERGY. Patent dated Oct. 4, 1977. Disclaimer filed Jan. 9, 1978, by the assignee, *Schlumberger Technology Corporation.*

The term of this patent subsequent to Mar. 16, 1993, has been disclaimed.

Disclaimer and Dedication

3,453,869.—*Lloyd G. Cherne*, Minneapolis, Minn. MECHANISM FOR PRESSURE TESTING INSTALLED SEWER PIPE FOR LEAKS. Patent dated July 8, 1969. Disclaimer and dedication filed Mar. 10, 1978, by the assignee, *Cherne Industrial, Inc.*

Hereby disclaims and dedicates to the Public the entire remaining term of said patent.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF APRIL 22, 1978

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	8-3-77
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	9-16-77
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	8-1-77
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	5-25-77
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	6-13-77
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	2-2-77
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	11-19-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	3-9-77
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	9-27-77
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	12-27-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	6-24-76
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	3-7-77
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	7-26-77
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	3-7-77
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors: Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	3-9-77
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	6-13-77

Expiration of patents: The patents within the range of numbers indicated below expire during April 1978, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,977,598 to 2,981,953, inclusive
Plant Patents..... Numbers 2,040 to 2,054, inclusive

REISSUES

MAY 23, 1978

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

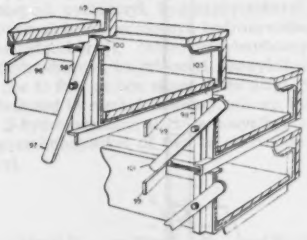
Re. 29,635
ROW FOLDING SEATING STRUCTURE

Robert G. McClelland, Grand Rapids, Mich., and David W. Raymond, Champaign, Ill., assignors to American Seating Company, Grand Rapids, Mich.

Original No. 3,667,171, dated Jun. 6, 1972, Ser. No. 104,917, Jan. 8, 1971. Application for reissue Oct. 14, 1975, Ser. No. 622,144

Int. Cl.[2] F04H *3/12*

U.S. Cl. 52—9 **18 Claims**



1. A seating structure comprising a plurality of telescoping rows *each having a bleacher seat portion at the forward end thereof and* arranged for movement between extended and retracted positions, each row *further* including two wheel-equipped carriage members, a vertical column mounted on each carriage member and provided with a cantilever arm adapted to be supported on the top of the next adjacent row toward the front of the seating structure when the structure is in extended position, a rear riser member *comprising a metal beam, said beam* connecting the upper portion of the columns, forwardly-extending support arms anchored upon said rear riser and structurally supported over the rear riser member of said next adjacent row when the seating structure is in extended position, and a platform on said support [arms.] *arm; said metal beam having means for continuously supporting the rear edge of said platform, said riser providing sufficient structural support to permit the seat portion of a row to be removed to provide an aisle at the footrest level.*

Re. 29,636
MANHOLE AND METHOD OF MANUFACTURE

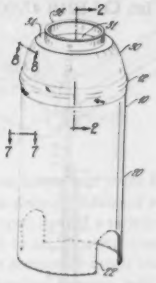
Agnar Gilbu, Conroe, Tex., assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Original No. 3,938,285, dated Feb. 17, 1976, Ser. No. 538,984, Jan. 6, 1975. Continuation of Ser. No. 322,344, Jan. 10, 1973, abandoned. Application for reissue Jan. 17, 1977, Ser. No. 760,252

Int. Cl.[2] E02D *29/14*

U.S. Cl. 52—20 **39 Claims**

1. A preformed manhole enclosure suitable for use underground and made of glass fiber reinforced plastic, the manhole enclosure comprising a tubular body and a dome at an upper end of the tubular body, the dome including a wall of continuous double curvature and having a manway providing access to the interior of the tubular body, the dome further including a load bearing shoulder and an integral stiffening collar, the load bearing shoulder circumscribing the manway and presenting a generally planar, upwardly facing annular surface for supporting a load, the stiffening collar extending generally perpendicularly upwardly from an inner edge of the shoulder and being effective to stiffen the shoulder against deflection due to externally applied loads, and a central vertical section through the dome being defined on each of opposite sides of the manway by a downwardly concave curved section of the wall extending upwardly from the tubular body and curving radially inwardly of the dome in a downwardly concave



curve, a section of the load bearing shoulder extending radially inwardly of the dome from an upper end of the downwardly concave section of the wall, and a section of the stiffening collar extending upwardly from an inner end of the section of the load bearing shoulder.

Re. 29,637
BATTERY-DRIVEN WATCH WITH BATTERY CONSUMPTION DISPLAY ALARM

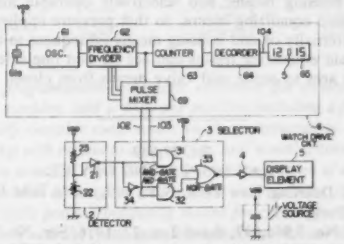
Hirotoki Takamune, Hoya, and Fujio Ishida, Kokubunji, both of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Original No. 3,898,790, dated Aug. 12, 1975, Ser. No. 413,951, Nov. 8, 1973. Application for reissue Aug. 2, 1977, Ser. No. 821,207

Claims priority, application Japan, Nov. 9, 1972, 47-112465; Nov. 20, 1972, 47-116312

Int. Cl.[2] G04C *3/00*; G04B *19/30*; G08B *21/00*

U.S. Cl. 58—23 BA **10 Claims**



1. In a battery driven electronic watch comprising a watch driver circuit, a battery for feeding current thereto, and a time-indicator operatively connected with said driver circuit, the improvement comprising a binary detector circuit connected to said battery for detecting when the source voltage falls below a predetermined level, a selector and drive circuit connected with the output of said detector, and an electrically illuminatable means connected with said selector and drive circuit, the brightness of said illuminatable means being modified from its normal state when said source voltage drops below said predetermined level in response to the binary logic output of said detector, said electrically illuminatable means

being mounted on the front and normally visible surface of said watch.

Re. 29,638

PRESSURE CONTROLLED TEST VALVE SYSTEM FOR OFFSHORE WELLS

Benjamin P. Nutter, Bellville, Tex., assignor to Schlumberger Technology Corporation, New York, N.Y.

Original No. 3,824,850, dated Jul. 23, 1974, Ser. No. 199,554, Nov. 17, 1971. Application for reissue Jul. 22, 1976, Ser. No. 707,798

Int. Cl.[2] E21B *47/00*

U.S. Cl. 73—151 **43 Claims**

1. A fluid pressure controlled well tester apparatus comprising: housing means adapted for connection to a pipe string and having a flow passage extending therethrough for conducting formation fluids from an isolated formation interval; valve means movable from a position closing said flow passage to a position opening said flow passage in response to a change in the pressure of fluids in the well annulus externally of said housing means; chamber means containing a compressible fluid medium, said valve means having a transverse, pressure area with one side thereof subject to the pressure of fluids in said well annulus and the other side subject to the pressure of said fluid medium; means for equalizing the pressure of said fluid medium with the hydrostatic head of the well fluids externally of said housing means; and selectively operable means for closing said equalizing means, so that pressure applied to the fluids externally of said housing means subsequent to the closing of said equalizing means can act on said one side of said pressure area to move said valve means from closed to open position.

Re. 29,639

SPRAY DISPENSING DEVICE

Harry S. Dearling, New York, N.Y., assignor to Tobe Dearling, New York, N.Y.

Original No. 3,964,647, dated Jun. 22, 1976, Ser. No. 557,320, Mar. 11, 1975. Application for reissue Jul. 6, 1977, Ser. No. 813,220

Int. Cl.[2] B67D *5/64*

U.S. Cl. 222—174 **9 Claims**

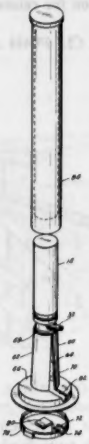
1. A spray dispensing device for dispensing a spray comprising, in combination,

a container for dispensing a quantity of a desired spray including valve means associated with said container and actuation means to operate said valve means to dispel a spray from said container,

a first housing for said container comprising a substantially frusto-conically shaped segment within which is disposed said container,

said container being disposed within said first housing and said first housing including an access opening therein to permit the spray when dispelled from said container to clear said housing,

said housing segment including a tapered axially disposed slot therein along the extent of said segment to accommodate the valve housing of said container when said container is inserted therein and said segment being resilient to outwardly expand upon insertion of said container therein to frictionally grip and retain said container therein,



means within said first housing to cooperatively contact the actuation means on said container, and

second housing means cooperatively interrelated with said first housing means and movable from a first position wherein no compressive force is exerted on said container to a second position wherein a compressive force is exerted on said container thereby to exert a force on said container actuation means to dispel a spray from said container.

Re. 29,640

CERTAIN SUBSTITUTED 2,6-DIAMINO-4-METHYL-NICOTINITRILES THE CORRESPONDING NICOTINAMIDES AND DERIVATIVES THEREOF

Gunther Lamm, and Johannes Dehnert, both of Ludwigshafen, Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

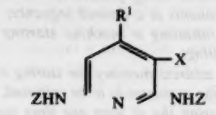
Original No. 3,853,895, dated Dec. 10, 1974, Ser. No. 328,459, Jan. 31, 1973. Continuation-in-part of Ser. No. 209,431, Dec. 17, 1971, abandoned. Application for reissue Aug. 5, 1976, Ser. No. 711,863

Claims priority, application Germany, Dec. 19, 1970, 2062717; Nov. 15, 1971, 2156545; Mar. 10, 1972, 2211663; Apr. 6, 1972, 2216570; Jun. 2, 1972, 2226933; Oct. 21, 1972, 2251702; Oct. 1972, 2251719; Dec. 1, 1972, 2258823; Dec. 2, 1972, 2259103; Dec. 6, 1972, 2259684; Dec. 13, 1972, 2260827; Dec. 27, 1972, 2263458; Japan, Dec. 16, 1972, 47-125836; United Kingdom, Dec. 13, 1972, 57442/72

Int. Cl.[2] C07D *213/57*

U.S. Cl. 260—294.9 **6 Claims**

1. A compound of the formula

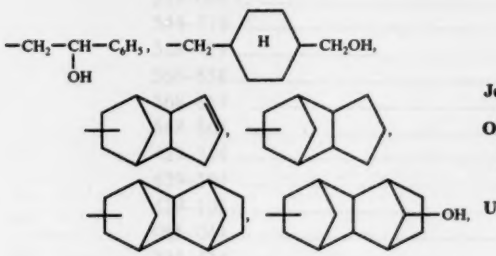


in which:

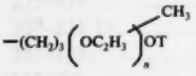
R^1 is hydrogen, alkyl of one to seven carbon atoms or phenyl;

X is cyano or carbamoyl; and

each Z, independently of one another, is hydrogen, alkyl of one to eight carbon atoms, hydroxyalkyl of two to eight carbon atoms, cyanoalkyl of two to seven carbon atoms, alkoxyalkyl of two or three carbon atoms in the alkyl and one to eight carbon atoms in the alkoxy, cyclohexoxypropyl, benzyloxypropyl, β-phenyl-ethoxypropyl, phenoxypropyl, tolyloxypropyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, hydroxycyclohexyl, β-hydroxyethoxycyclohexyl, norbornyl, hydroxynorbornyl, hydroxymethylnorbornyl, chloromethylnorbornyl, β-hydroxyethylnorbornyl, bicyclooctyl, phenylalkyl or tolylalkyl of one to four carbon atoms in the alkyl, phenyl, phenyl substituted by methyl, methoxy, ethoxy, hydroxy, chloro or β-hydroxyethoxy, allyl, carboxyethyl, carboxypentyl, ω-pyrrolidonylalkyl of two to six carbon atoms in the alkyl,



$-(CH_2)_2O(CH_2)_2OH$, $-(CH_2)_3O(CH_2)_4OH$, $-(CH_2)_3O(CH_2)_6OH$,



or $-(CH_2)_3(OC_2H_4)_nOT$,

n being 1, 2, 3 or 4, and

T being hydrogen, alkyl of one to four carbon atoms, benzyl, phenylethyl, cyclohexyl, phenyl or tolyl.

Re. 29,641

MOIST HEATING PAD

Thomas G. Woods, Battle Creek, Mich., assignor to Battle Creek Equipment Company, Battle Creek, Mich.

Original No. 3,889,101, dated Jun. 10, 1975, Ser. No. 514,633, Oct. 15, 1974. Application for reissue Aug. 12, 1976, Ser. No. 713,691

Int. Cl.[2] **H05B** *3/36*

U.S. Cl. 219—527 **11 Claims**

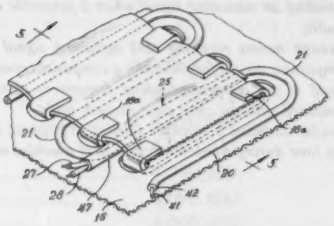
1. A moist heating pad comprising:

a. a flexible moisture permeable base sheet,

b. an electrical resistance wire heating element having an insulation sleeve mounted on said flexible base in a pattern comprising a plurality of substantially parallel banks of backward and forward sinuous loops having straight portions substantially perpendicular to the longitudinal direction of said banks,

c. at least one thermostat encased in an insulation jacket connected in series with said heating element and connected at both of its ends by insulated lead wires of a highly conductive metal, said thermostat being positioned parallel and in close proximity to a straight portion of one loop of said heating element,

d. a plurality of strips of a water [absorption] *adsorption* lead alloy mounted on said flexible base sheet each within



one of said sinuous loops *said strips being heated by said heating elements to drive off adsorbed water,*

e. an electrical line cord having a switch therein being electrically connected to said heating element, and

f. a flexible moisture permeable cover enclosing said flexible base sheet, said heating element, said [metal] strips and said thermostat.

Re. 29,642

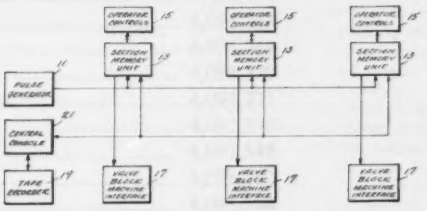
PROGRAMMABLE AUTOMATIC CONTROLLER

Jerome A. Kwiatkowski, and Charles L. Wood, both of Muncie, Ind., assignors to Ball Corporation, Muncie, Ind.

Original No. 3,969,703, dated Jul. 13, 1976, Ser. No. 408,208, Oct. 19, 1973. Application for reissue Feb. 28, 1977, Ser. No. 772,848

Int. Cl.[2] **G05B** *1/08, 11/18;* **G06F** *3/05, 15/46*

U.S. Cl. 364—900 **31 Claims**



25. A programmable automatic controller for controlling at least one machine, said at least one machine including a plurality of cyclically movable components which are actuated in a timed relationship with respect to one another, said movable components each being actuated at respective relative times in each of a plurality of machine cycles, and said at least one machine including machine cycle position indicating means for cyclically moving in synchronism with the cyclic operation of said at least one machine, said controller comprising:

timing means responsive to said machine cycle position indicating means for generating a digital signal in synchronism with the movement of said cycle position indicating means, said digital signal providing an instantaneous indication of the time elapsed in each cycle of operation of said machine,

a storage means for storing the sequential relative times in a cycle of machine operation when each of the plurality of components is to be actuated,

means coupled to said storage means for selectively varying the actuating times of selected components stored in said storage means while said machine is operating to thereby change the

relative times in each machine cycle when said selected machine components are to be actuated,

means for cyclically reading out the contents of said storage means,

comparator means responsive to said timing means and said readout means for comparing the digital signal corresponding to the time elapsed in each cycle with a relative component actuating time stored in said storage means, said comparator providing an actuating signal when a favorable comparison results,

addressing means receiving said actuating signal from said comparator means for providing a component operating command to the component whose component actuating time compared with the cycle time elapsed, and

means for initiating a machine starting or stopping sequence at any time during a machine cycle, said machine starting and stopping sequences being preselected to inhibit or enable machine components in a desired sequence,

said means for initiating a machine starting or stopping sequence comprising:

a first start-stop address memory for storing at least one time when a start-stop sequence is to be initiated,

means for comparing the at least one time stored in said first start-stop address memory with the address stored in said addressing means when the cycle time elapsed corresponds to the time a component is to be enabled or inhibited,

means in response to a compare by said comparing means for enabling a selected one of a plurality of random access memory units, and

means for reading out the machine actuating commands stored in said random access memory units in sequence, said commands controlling the operation of said machine components.

PATENTS

GRANTED MAY 23, 1978

ERRATA

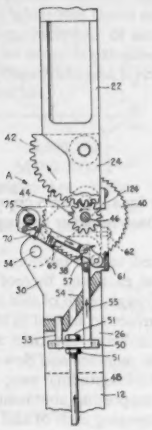
For CLASS	See PATENT NO.
034–092	4,090,312
222–070	4,090,475
134–018	4,090,523
400–134	4,090,599
400–213	4,090,600
206–410	4,090,659
339–019	4,090,667
366–076	4,090,695
366–327	4,090,696
301–037 AT	4,090,744
131–023 R	4,090,826
219–069 C	4,090,961
544–378	4,091,023
568–729	4,091,038
568–858	4,091,039
568–853	4,091,040
568–865	4,091,041
427–314	4,091,148
429–104	4,091,151
429–105	4,091,152
085–041	4,091,173
235–424	4,091,268
235–098 B	4,091,269
235–419	4,091,270
235–419	4,091,271
307–221 D	4,091,278
251–129	4,091,348
365–001	4,091,362
340–146.3 H	4,091,394
360–135	4,091,454

PATENTS

GRANTED MAY 23, 1978

GENERAL AND MECHANICAL

4,090,264
LEG PROSTHESIS
Johnnie W. Thompson, Rte. 3, Box 263, Pelzer, S.C. 29669
Filed Nov. 26, 1976, Ser. No. 745,092
Int. Cl.[2] A61F *1/04, 1/08*
U.S. Cl. 3—27 **19 Claims**



1. In an artificial leg device having an upper support member, a lower support member, a mechanical knee joint connected between said upper and lower support members, locking means carried by said lower support member for locking said upper and lower support members in a locked position to support the weight of the wearer, the improvement comprising:

(a) said knee joint having a double-joint pivot connection connected between said upper and lower support members comprising:

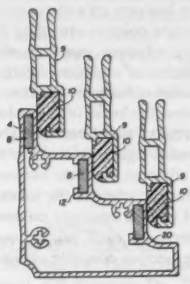
(i) a pair of linkage arms pivotably connected at a first pivot to said upper support member and at a second pivot to said lower support member,

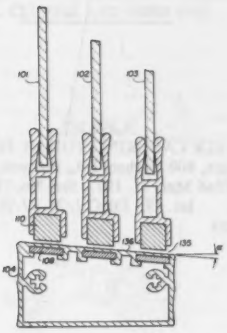
(ii) gear drives means connected between said upper and lower support members permitting said upper support member to turn about said first pivot while said lower support member turns about said second pivot providing smooth synchronous motion therebetween and increased knee bend flexibility, and

(iii) a pair of tie arms pivotably connected to said upper and lower support members for maintaining said upper and lower supports at substantially the same angle relative to the knee joint connection during bending of the knee.

4,090,265
PARTITION WALL FOR WET CHAMBERS
Heinz Georg Baus, Ulmenweg 46, Thun, Switzerland (3601)
Filed Nov. 24, 1976, Ser. No. 744,875
Claims priority, application Germany, Dec. 2, 1975, 2554097; Dec. 2, 1975, 2554098
Int. Cl.[2] A47K *3/4*
U.S. Cl. 4—154 **15 Claims**

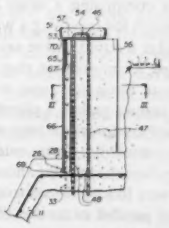
1. Partition wall for wet chambers particularly for bathrooms or stall showers having several slidable wall panels with each wall panel suspended in an upper guide rail and with each wall panel having a lower guide ledge guided in a lower closed guide member, said lower closed guide member being shaped with steplike guide rails one above the other and having one continuous upper surface with said lower guide ledge disposed above the upper surface of the steplike guide rails, said wall panels having permanent magnets installed in said lower guide ledges of the wall panels, said guide rails having keeper means, and each wall panel disposed against a surface of a guide rail





and held by magnetic force resulting from the attraction of said permanent magnets and said keeper means, in a direction perpendicular to the plane of the wall panel, and guided at said surface.

4,090,266
SWIMMING POOL CONSTRUCTION
John W. Price, P.O. Box 783, Moncton, New Brunswick, Canada
Filed Mar. 15, 1976, Ser. No. 667,018
Claims priority, application Canada, May 17, 1976, 242142
Int. Cl.[2] E04H *3/16*
U.S. Cl. 4—172.19 **11 Claims**



1. A wall assembly for a swimming pool comprising a con-

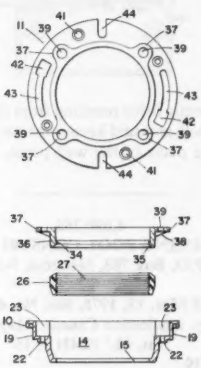
crete footing for supporting said assembly, fiberglass reinforced or metal panel members extending upwardly from said concrete footing and arranged side by side in a row, the bottom edges of said penal members being embedded in said concrete footing, a flange formed on each vertically extending side edge of each panel member with adjacent flanges of adjacent panel members being connected together by mechanical fasteners, vertically extending concrete columns located on the outside of and providing lateral support for said panel members and supported at their bottoms on and connected to said concrete footing, one concrete column extending from the top of each joint between two adjacent panel members to the concrete footing, the majority of columns being spaced apart from immediately adjacent columns in the row a distance at least as great as the greatest thickness of the column measured in the direction of the row of panel members, horizontal reinforced concrete beam means rigidly joining the top of each concrete column to each adjacent concrete column and supported on said concrete columns, wherein the joints between said members are enclosed by said concrete columns on the outside of the panel members and each pair of connected flanges are embedded in a respective concrete column.

4,090,267

SELF CAULKING TOILET DRAIN

Casper Cuschera, 800 Durham Rd., Fremont, Calif. 94538

Filed Mar. 31, 1977, Ser. No. 783,319
Int. Cl.[2] E03C *1/26, 11/00*
U.S. Cl. 4—288 **7 Claims**



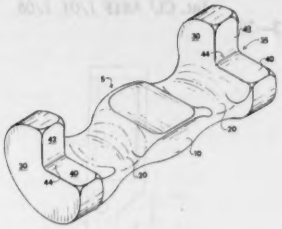
1. A toilet drain comprising a drain body having a bore extending therethrough for receiving a waste discharge pipe; a resilient sealing gasket secured within said bore and about said waste discharge pipe; a compression ring disposed in said bore and about said waste discharge pipe, said compression ring impinging on said sealing gasket, a plurality of ears extending outwardly from said compression ring; a plurality of hollow bosses extending outwardly from said drain body, each adapted to receive one of said ears therein, screw means extending from said ears to said bosses to compress said sealing gasket in a direction parallel to the axis of said drain body; and means for converting said compression of said gasket to lateral expansion to effect a seal between said drain body and said waste discharge pipe.

4,090,268

FOOT SUPPORT FOR SUNBATHERS

Jeanette A. Turner, P.O. Box 7204, Greensboro, N.C. 27407

Filed Aug. 30, 1976, Ser. No. 718,530
Int. Cl.[2] A47C *20/00*
U.S. Cl. 5—327 R **4 Claims**



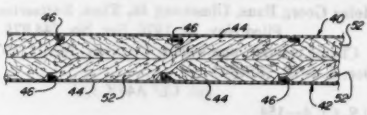
1. A foot support for sunbathers comprising:
a. an elongated base member having an upper contoured surface;
b. a pair of spaced saddle portions formed in said upper surface adjacent each end thereof and extending transversely therethrough, each of said saddle portions including a curved surface so shaped as to form a series of connected parabolas being upturned along the longitudinal axis of said base member and downturned in a direction transverse to the longitudinal axis;
c. a pair of foot supporting abutments extending vertically upward from opposing ends of said base member immediately adjacent said saddle portions;
d. each of said abutments including a cutout therein defined by a vertical wall and a horizontal ledge extending perpendicularly from the base of said vertical wall, said horizontal ledge being spaced above said upper surface of said saddle portion a distance such as to support said ankle bone when occupied and said vertical dimension of said abutment and said dimensions of said cutout being such that, when occupied, said foot supporting abutment engages the outer surface of the rear portion of the foot in an area at least partially surrounding the ankle bone;
e. said foot supporting abutment being spaced apart a distance substantially equal to the combined width of the feet of a normally sized sunbather;
f. whereby when positioned in said support, the feet are maintained in a position perpendicular to the ground and the legs are maintained in a position permitting even exposure to the sun.

4,090,269

INSULATED COVERING

Harry E. Hunt, Chicago, Ill., assignor to Alpine Designs, Inc., Boulder, Colo.

Filed Mar. 1, 1976, Ser. No. 662,355
Int. Cl.[2] A47G *9/00*
U.S. Cl. 5—343 **14 Claims**



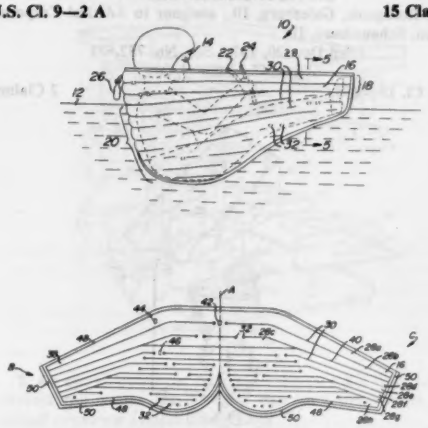
1. In an insulated covering comprising:
inner and outer coextensive layers secured together along their outer peripheral edges, and
a plurality of flexible insulating plies interposed between said inner and outer layers, each ply having one side edge affixed to one of said coextensive layers and an opposite

side edge affixed to the other of said layers, said insulating plies extending between said inner and outer layers in substantially parallel spaced apart relation to one another, and each insulating ply being composed of a resilient fill material being compressible in thickness having continuous filaments oriented in the lateral direction of extension of each ply from one side edge to the opposite side edge, each ply being of a width exceeding the distance separating adjacent plies so that each ply overlaps each next ply in succession to define plural insulating plies of substantially uniform thickness between said inner and outer coextensive layers when said layers are pressed inwardly toward one another, each pair of successive plies along with said inner and outer coextensive layers defining a chamber therebetween when said layers resiliently expand away from one another.

4,090,270
MINI-BOAT

John J. Horan, 420 Quigley Ave., Willow Grove, Pa. 19090

Filed Nov. 29, 1976, Ser. No. 745,736
Int. Cl.[2] B63B *7/00*
U.S. Cl. 9—2 A **15 Claims**



1. An inflatable mini-boat, comprising:

a compliant inflatable hull of inner and outer panels and having a deep stern portion contoured at the point of maximum depth to contiguously support the buttocks and back of an occupant seated therein, and a shallow bow portion contoured to contiguously support his legs extended forwardly and upwardly, said hull being partitioned by discontinuous seams of preselected spacing to each other between the opposed surfaces of said panels and co-directional with the length of the mini-boat to form a plurality of varying-width tubular segments intercommunicating through the passages formed by the discontinuities in the seams; and

means for inflating said hull;

whereby the inflation capacity is limited to selected areas for maximum stability.

11. A method for fabricating a mini-boat comprising the following steps:

patterning a first panel of gas impervious compliant material, said panel having a pair of mirror-imaged sections formed about a symmetrical axis, each of said sections comprising a substantially lounge chair contour formed along a first edge thereof extending from said axis to a second edge distal thereform and returning to said axis along a third edge, said first, second and third edges forming respectively, one side of the keel, bow and gunnel of the mini-boat;

forming a second panel identical to said first panel and superimposing said first and second panels over one another in symmetrical relationship;

sealing the outer peripheries of said first and second panels to one another,

partitioning the sealed panels into a plurality of inflatable cells by forming at least one continuous longitudinal seam between said panels and said opposing respective second edges of each of the sealed sections;

forming at least one orifice in each of the partitioned cells for permitting the ingress of a gaseous medium;

sealing by prearranged discontinuous seams respective ones of the partitioned cells into a plurality of inflatable tubular segments, each of said tubular segments inflatably communicating with the other within a common cell;

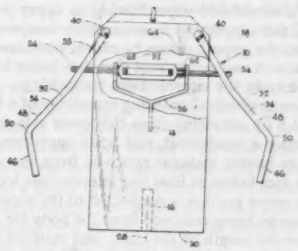
folding the sealed sections over one another about said axis; and

sealing the opposing first and second edges of each of said folded sections to each other to form the keel and bow of the mini-boat.

4,090,271
CHIMNEY CLEANER

Carl F. Piontkowski, 38 Ridge Dr., Old Saybrook, Conn. 06475, and George L. Yarocki, 408 Riverside Dr., Torrington, Conn. 06790

Filed Dec. 29, 1976, Ser. No. 755,483
Int. Cl.[2] F23J *3/02;* **B08B** *9/02*
U.S. Cl. 15—243 **7 Claims**



1. A chimney cleaner comprising: a frame adapted for suspension from a flexible support and when so suspended having a given orientation and a vertical axis, two scrub members located on opposite sides of said vertical axis, means connecting said two scrub members to said frame about two spaced parallel pivot axes fixed relative to said frame and located in a common horizontal plane when said frame is in said given orientation, each of said scrub members extending generally downwardly from its associated one of said pivot axes, each of said scrub members having a lower end portion extending a substantial distance in the direction parallel to said pivot axes and providing a first surface facing generally downwardly and outwardly from said central axis, each of said scrub members further having an adjacent portion located above and adjacent said lower end portion which adjacent portion provides a second surface facing generally upwardly and outwardly from said central axis, said first and second surfaces of each scrub member joining one another along a transition area adapted to engage the wall of the chimney being cleaned and at which transition area the scrub member has a maximum spacing from said central axis, and holding means located between said two scrub members, said holding means including two end portions each connected to a respective one of said scrub members with a loose fit so as to prevent the associated scrub members from moving inwardly toward said central axis beyond a given inner limit while allowing it at least a small amount of free movement in the opposite direction, to thereby hold said two chimney wall engageable transition areas apart from one another by a minimum spacing while allowing them at least a small amount of free spreading movement beyond such minimum

spacing, said holding means also including means for adjustably varying the spacing of said two end portions thereof to thereby vary said minimum spacing of said transition areas, said two scrub members each being biased solely by gravity toward its said inner limit and being movable away from said inner limit to increase the spacing of said transition areas by forces arising from contact with a chimney wall during a chimney cleaning operation.

4,090,272

WINDSHIELD WIPER

Raymond P. Porter, North Dartmouth, Mass., assignor to Acushnet Company, New Bedford, Mass.

Filed Aug. 12, 1976, Ser. No. 713,840
Int. Cl.[2] B60S *1/38*
U.S. Cl. 15—250.36 **8 Claims**

1. In a windshield wiper having an upper portion, a lower portion, and supporting superstructure comprising yokes connected to the upper portion by claws, one claw being located towards each end and at least one claw being located intermediate the ends, the improvement comprising:

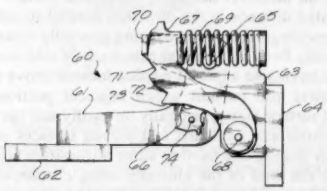
said lower portion consisting essentially of a flangeless body and a lip extending from the lower side thereof for contacting a windshield, said body supporting said lip, said body having material removed from the sides thereof in the area below at least one intermediate location in which the upper portion is connected to the superstructure, said material being removed from the body for a length longer than the length of the claw, said material being removed parallel to said lip to the upper limit of said body.

4,090,273

DETENT FOR MECHANICAL LINKAGE

George H. Hurst, Jr., 16491 Harbour La., Huntington Beach, Calif. 92649

Filed Mar. 9, 1977, Ser. No. 775,780
Int. Cl.[2] E05D *11/06, 11/08*
U.S. Cl. 16—144 **26 Claims**



1. A detent for a mechanical linkage comprising:

a movable linkage having a surface of travel in which a generally V-shaped notch with edges and a vertex is formed;

a rotatable cam follower having first and second sides meeting to form a corner that fits in the notch;

means for urging the cam follower and the surface of travel of the linkage against each other; and

an arcuate concave relief on the first side of the cam follower adjacent to the corner, the relief being shaped to embrace one edge of the notch without such edge bottoming on the cam follower as the corner of the cam follower enters the notch from a given direction.

20. A detent for a car door hinge comprising:

a first bracket attached to the car door;

a second bracket attached to the cowl of the car;

a hinge interconnecting the first and second brackets;

a linkage having a surface of travel in which a generally V-shaped notch with edges and a vertex is formed;

means for pivotably mounting one end of the linkage on one of the brackets;

a cam follower having first and second sides meeting to form a corner that fits in the notch;

means for rotatably mounting the cam follower on the other bracket; and

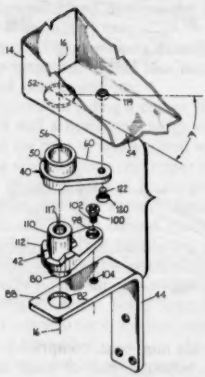
means for urging the cam follower and the surface of travel of the linkage against each other.

4,090,274

GRAVITY DOOR CLOSER

Jack Bourgeois, Galesburg, Ill., assignor to Admiral Corporation, Schaumburg, Ill.

Filed Dec. 20, 1976, Ser. No. 752,651
Int. Cl.[2] E05F *1/06*
U.S. Cl. 16—153 **2 Claims**



1. A hinge device for a refrigerator door which is axially aligned with an upper hinge member to allow pivotal movement of said door about an axis, said hinge device comprising:

a first member having a hub section disposed in an opening in the door in alignment with said axis;

a second member having a hub section disposed in an opening on the cabinet of the refrigerator and aligned with said axis;

said hub section of said second member including a pin extending along said axis to be received within a hole in said hub section of said first member;

anti-torque means on each of said members extending radially from said axis to respectively connect said members to said door and said cabinet at locations thereon spaced from said axis to prevent rotational forces on said members generated during said pivotal movement of said door from being transmitted through said hub sections to said opening in said door and said cabinet;

said first and said second members including interengaging camlobes around said hub sections each of which include alternating raised and lowered horizontal flat surfaces and inclined surfaces therebetween;

adjacent said inclined surfaces of said first and said second members being in sliding contact when said door is in a

closed position to provide a positive closing force to said door;

said adjacent inclined surfaces remaining in contact during said pivotal movement of said door from a closed position tending to raise said door until sliding contact between said raised horizontal flat surfaces of said camlobes respectively of said first and said second members is established; and

said sliding contact between said horizontal flat surfaces of said camlobes being maintained throughout a predetermined range of angular positions of said door relative to said closed position without any force being generated by said hinge device tending to close said door.

4,090,275

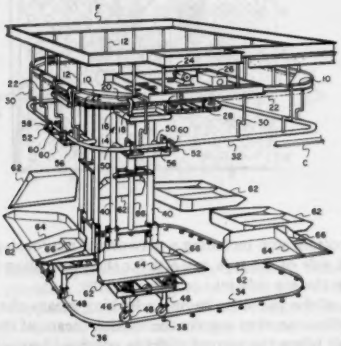
CONVEYOR TRAY SYSTEM FOR ENTRAILS

Olaf V. Jorgensen, R.R. No. 1, Kettleby, Ontario, and Knud Simonsen, P.O. Box 4, Nobleton, Ontario, both of Canada

Filed Dec. 15, 1976, Ser. No. 750,971

Int. Cl.[2] A22C *17/00*

U.S. Cl. 17—24 **13 Claims**



1. An entrail conveyor system for use on a kill floor having carcass rail means for carrying carcasses thereacross, said entrail conveyor system comprising;

working platform means of adjacent to one side of said carcass rail means;

entrail tray means;

conveyor means for moving said tray means along a predetermined path, on the opposite side of said carcass rail means, and,

power operated movable support means for carrying said tray means on said conveyor means and operable for extending said tray means away from said conveyor means towards said working platform means, and for retracting said tray means away from said working platform means back to said conveyor means.

4,090,276

TEXTILE CARDING

Gordon Roberts, Marsaxlokk, Malta, assignor to Glen Walton Company Limited, England

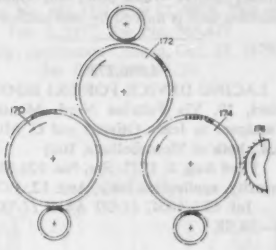
Continuation of Ser. No. 481,829, Jun. 21, 1974, abandoned, which is a division of Ser. No. 315,415, Dec. 15, 1972, abandoned. This application Jul. 19, 1976, Ser. No. 706,601

Claims priority, application United Kingdom, Dec. 28, 1971, 60242/71

Int. Cl.[2] D01G *15/12, 15/84*

U.S. Cl. 19—99 **7 Claims**

1. In a fibre opening machine, a roller train comprising first, second and third card-clothed rollers and operatively connected drive means therefor, said first card clothed roller rotating in a first direction and having at least some of its teeth pointing in a direction opposite to said first direction and at least some of its teeth pointing in said first direction; said second card clothed roller adjacent to and co-operating with the said first card clothed roller, but rotating in the opposite direction to said first card clothed roller, the surface speed of said first roller being not less than 30% that of said second roller; and said third card clothed roller adjacent to and co-operating with said second roller, said third roller having at least some of its teeth pointing in the direction of rotation of said third roller and at least some of its teeth pointing in a direction opposite to said direction of rotation of said third roller, and said third card clothed roller rotating in said first direction; the surface speed of said second roller being not less than 30% that of said third roller, said second card clothed roller having a first set of teeth



pointing in the direction of rotation of said second roller so as to have point-to-point action with said teeth on said first card clothed roller whereby fibres on the teeth of said first card clothed roller are subjected to a gentle opening action and are transferred to the second card clothed roller on which they form a thinner web than on said first card clothed roller and a second set of teeth pointing in the opposite direction to the direction of rotation of said second roller so as to have point-to-point action with said teeth on said third card clothed roller whereby fibres on the teeth of said second card clothed roller are subjected to a gentle opening action and are transferred to the third card clothed roller on which they form a thinner web than on said second card clothed roller; and means for doffing fibres from said third card clothed roller.

4,090,277

TEXTILE FIBRE COMBING

Derek William Fraser Turpie, and Jaroslav Klazar, both of Port Elizabeth, South Africa, assignors to South African Inventions Development Corp., Pretoria, South Africa

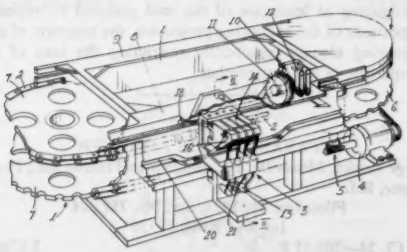
Filed Feb. 12, 1976, Ser. No. 657,530

Claims priority, application South Africa, Feb. 13, 1975, 75/0926

The portion of the term of this patent subsequent to Jul. 27, 1993, has been disclaimed.

Int. Cl.[2] D01G *19/10*

U.S. Cl. 19—115 R **7 Claims**



1. Apparatus adapted to advance a sliver of textile or the like fibres through at least some of a combing operation including:

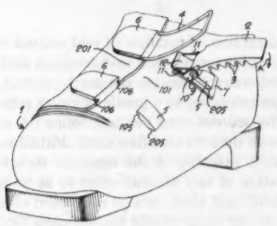
a track forming an endless path and having at least one linear section,
an endless flexible support element carried by and movable along the track,
means for driving said support element,
at least one combing unit secured to said endless flexible support element for movement therewith, said combing unit comprising plural combing elements and means mounting at least one said combing element for movement relative to the other said combing element,
guide means extending along said path at said linear section,
said guide means and said combing unit comprising cooperating means for causing movement of said movable combing element relative to said other said combing element as said combing unit is moved by said endless element.

4,090,278

LACING DEVICE FOR SKI BOOTS

Icaro Olivieri, 10, Via Feltrina Nord, Montebelluna, Italy (31044), assignor to Icaro Olivieri and C. Minuterie Metalliche S.p.A., both of Montebelluna, Italy

Filed Aug. 3, 1977, Ser. No. 821,556
Claims priority, application Italy, Aug. 12, 1976, 12758 A/76
Int. Cl.[2] A43C *11/00*; A43B *11/00*
U.S. Cl. 24—70 SK **5 Claims**



1. In a ski boot of the type comprising a ski boot upper provided with two flaps, a lacing device including a hooked lever-like lacing member provided on one flap and intended to cooperate with a ring-like lacing member on the other flap, anchoring means for securing at least one of said lacing members in a removable manner onto the corresponding flap, said anchoring means comprising:
(a) an anchoring projection provided on the flap and presenting on its periphery at least two opposed grooved or recessed portions, so as to form an enlarged head;
(b) a carrier plate onto which there is mounted the lacing member, said carrier plate presenting an aperture having such a contour as to pass snugly over the said enlarged head of the anchoring projection;
(c) a locking element to be inserted between the carrier plate and the enlarged head of the anchoring projection, said locking element presenting at least one part capable of engaging at least one of the said grooved or recessed portions of the anchoring projection, the insertion of said locking element practically restricting the area of the aperture of the carrier plate.

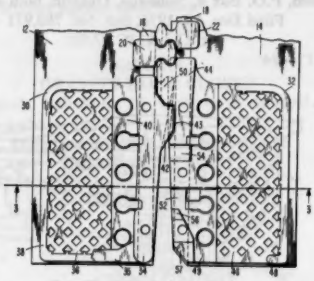
4,090,279

SEPARABLE SLIDE FASTENER

George Wasko, Meadville, Pa., assignor to Textron Inc., Providence, R.I.

Filed Jan. 10, 1977, Ser. No. 758,324
Int. Cl.[2] A44B *19/36*
U.S. Cl. 24—205.11 F **2 Claims**

1. A separable slide fastener comprising
first and second mounting tapes disposed adjacent each other;
a series of slide fastener coupling elements formed along the edge of each of the tapes adjacent the opposite tape;
first and second sliders entrained on the coupling elements and movable along the slide fastener to selectively engage and disengage the coupling elements of the two tapes, the first slider being oriented in an upward direction and the second slider being oriented in a downward direction;
a pull tab for each slider;
spring biased locking means on each of the sliders to engage the coupling elements to prevent movement of the slider, pulling of the pull tab of each slider disengaging the locking means to allow the slider to move;
a respective bottom stop formed on both sides of the bottom portion of each of the tapes;
a pin side on each bottom stop formed along the edge of the tape adjacent the opposite tape, the pin sides receiving the sliders when the sliders are moved to the bottom stops;



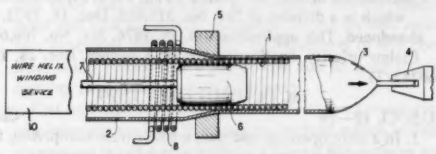
each bottom stop including a network of reinforcing ribs on each side of the tape and a slider shelf extending outward from the pin side into reinforcing ribs;
a first of the pin sides having a locking means channel defined in it so as to receive the locking means of the second slider when the second slider is positioned over the bottom stops;
the channel being sized so that its bottom is even with the slider shelf of the bottom stop;
a first canted cam surface formed in the first pin side to define the lower limit of the channel; and a second canted cam surface formed on the lowermost end of the first pin side, said first and second canted cam surfaces being positioned to engage the locking means on the second slider to allow the first pin side to be withdrawn therefrom to separate the tapes.

4,090,280

MANUFACTURE OF HELICAL WAVE GUIDES

Bernard Ormili, Lyon, and Georges Comte, St Leu la Foret, both of France, assignors to Les Cables de Lyon S.A., Lyon Cedex, France

Filed Jan. 28, 1977, Ser. No. 763,627
Claims priority, application France, Feb. 5, 1976, 76 03209
Int. Cl.[2] H01P *11/00*
U.S. Cl. 29—33 K **2 Claims**



1. A machine for manufacturing circular section helical wave guides, the machine comprising: means for winding a

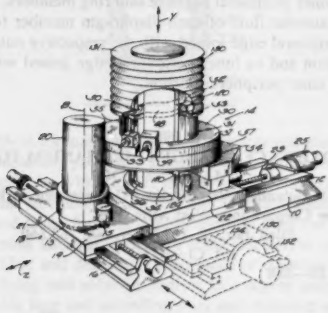
helix from conductor wires having a thermoplastic insulative covering, means for sliding a metal tube around said helix, a reducing die, means for drawing said tube and said helix through said die to reduce the diameter of said tube, a bore-calibrating mandrel held inside said helix where it passes through said die, and a heater disposed around said metal tube immediately upstream of said die to soften the outer surface of said helix for welding to the inner surface of said tube as they pass through said die.

4,090,281

MACHINE TOOL WITH MULTIPLE TOOL TURRET

Charles F. Hautau, Oxford, Ohio, assignor to Ameco Corporation, Menomonee Falls, Wis.

Filed Nov. 19, 1976, Ser. No. 743,262
Int. Cl.[2] B23B *9/00, 39/20*
U.S. Cl. 29—40 **13 Claims**



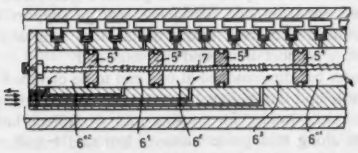
1. Machining apparatus comprising a machine frame, a tool turret, a plurality of machining tools carried by said turret, means for supporting said turret to afford rotation of said turret about a Y axis, said means including a column and a sleeve surrounding said column and bearing means on said sleeve for rotatably supporting said turret, means for rotating said turret to position a selected tool along a Z axis at a right angle with respect to the Y axis, means for supporting said column on said frame for movement along said Z axis for tool feed, tool drive means for rotating said selected tool when a tool is in the working position along the Z axis, guide means for guiding movement of said sleeve along said Y axis, said guide means including ways extending along said column and fixed to said column and bearings supported on said sleeve and cooperating with said ways to guide movement of said sleeve along said column and including elevator means for raising and lowering said sleeve and said turret along said Y axis.

4,090,282

DEFLECTION CONTROL DEVICE

Rolf Lehmann, Rudolfstetten, Switzerland, assignor to Escher Wyss Limited, Zurich, Switzerland

Filed Oct. 13, 1977, Ser. No. 841,705
Claims priority, application Switzerland, Oct. 19, 1976, 013205/76
Int. Cl.[2] B21B *13/02*
U.S. Cl. 29—116 AD **12 Claims**



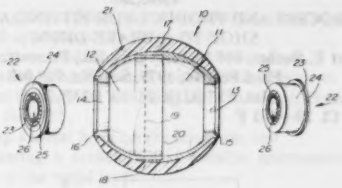
1. Deflection control device, having a stationary supporting member; said supporting member comprising a series of hydrostatic supporting elements; said device also having a shell movable transversely relatively to the series of said supporting elements; ducts being provided in said supporting member for supplying or discharging pressure fluid for said supporting elements; a partition wall separating two of said ducts from one another; the position of said partition wall being variable along the series of said supporting elements.

4,090,283

METHOD OF MAKING HOLLOW GLOBULAR ROLLER

George Woolley, 135 Berlioz Shore, Apt. 1N, Nuns Island, Quebec, Canada

Division of Ser. No. 631,416, Nov. 12, 1975. This application Feb. 3, 1977, Ser. No. 765,427
Claims priority, application Canada, Oct. 22, 1975, 238160
Int. Cl.[2] B21D *53/26*
U.S. Cl. 29—159 R **5 Claims**



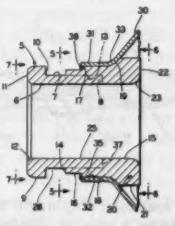
1. A method for making a globular roller, comprising the steps of: impact extruding a pair of semi-globular segments of rigid structurally secure impact extrudable material, said segments being assemblable into a globular roller, one of said semi-globular segments including a flattened chord penetrated by a well recess and having an open circumferential end provided with a male flange, the other of said segments including a flattened chord penetrated by a well and having an open circumferential end provided with a female recess; assembling said two segments with the male flange of one mating with the female recess of the other at a seam to provide a globular roller assembly; and finally, applying a coating of a resilient material to the assembled semi-globular segments, thereby permanently to secure the semi-globular segments together, and providing said globular roller.

4,090,284

METHOD OF MAKING A SINTERED PULLEY HUB CONSTRUCTION

Derald H. Kraft, Canton, Ohio, assignor to Aspro, Inc., Canton, Ohio

Division of Ser. No. 680,427, Apr. 26, 1976, Pat. No. 4,056,014. This application Apr. 5, 1977, Ser. No. 784,678
Int. Cl.[2] B21K *1/40;* **B22F** *7/06*
U.S. Cl. 29—159.3 **11 Claims**



1. In a method of making a pulley hub including the steps of:

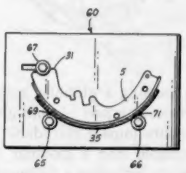
(a) pressure-forming a first metal powder mixture in a mold to form a first tubular member having a cylindrical body and radially outwardly extending hub pulling flange means formed on one end thereof;
(b) pressure-forming a second metal powder mixture in a second mold to form a second tubular member having an interior annular cavity formed in one end thereof and radially outwardly extending pulley cup mounting flange means formed on the other end thereof;
(c) telescopically inserting at least a portion of the cylindrical body of the first tubular member into the annular cavity of the second tubular member; and
(d) sintering the telescopically joined first and second tubular members to form an integral sintered powder metal pulley hub having a hub pulling flange formed by the flange means of the first tubular member on one end of the pulley hub, and having a pulley cup mounting flange formed by the flange means of the second tubular member on the opposite end of said pulley hub.

4,090,285

PROCESS AND PRODUCT FOR FITTING A BRAKE SHOE TO A BRAKE DRUM

Elbert E. Bochat, 805 Miller Valley Rd., Prescott, Ariz. 86301

Filed Feb. 14, 1977, Ser. No. 768,066
Int. Cl.[2] B21K *21/10*; B23P *7/00*
U.S. Cl. 29—401 F **7 Claims**



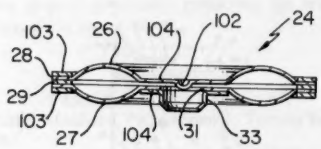
1. A method for replacing brake shoes comprising secondary and primary shoes in a brake assembly to assure that the replacement brake shoes properly fits the brake drum of the used brake assembly, comprising the steps of:
establishing the relationship of the arc of the curve of the secondary and primary shoes to its anchor pin; and
fitting a new brake shoe to the established relationship between the arc of the drum and the respective anchor pin.

4,090,286

FLUID OPERATED DIAPHRAGM ASSEMBLY AND METHOD OF MAKING THE SAME

Roger P. Sepso, Stratford, Conn., assignor to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 568,425, Apr. 16, 1975, abandoned, which is a continuation of Ser. No. 428,875, Dec. 27, 1973, abandoned. This application Oct. 20, 1976, Ser. No. 734,348
Int. Cl.[2] B23P *19/04*
U.S. Cl. 29—454 **1 Claim**



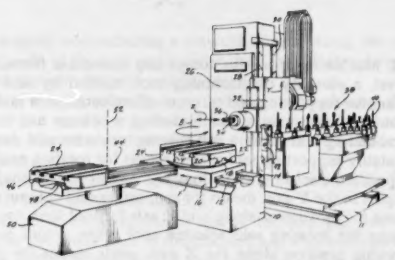
1. A method of making a diaphragm assembly comprising the steps of providing a pair of diaphragm members each having annular inner and outer peripheral portions separated from each other by an annular fluted portion, disposing and securing a ring member between said outer peripheral portions of said diaphragm members whereby a chamber is defined between said diaphragm members inboard of said ring member, forming said diaphragm members each to have a natural tendency to maintain its respective inner and outer peripheral portions coplanar with each other whereby said inner peripheral portions are normally spaced from each other a distance that is approximately the thickness of said ring member, securing a pair of additional ring members to the outer surfaces of said outer peripheral portions of said diaphragm members, forming each ring member to comprise a flat washer-like member that is substantially identical to the other ring members, arranging said ring members so as to be coaxially aligned in said assembly, forming said fluted portion of each diaphragm member to have a single annular flute therein with its concave side facing the concave side of the other diaphragm member and beginning substantially immediately at the coaxially aligned inner peripheral edges of said ring members, and forming said annular flute of each diaphragm member to have an outer peripheral edge joined with the respective outer peripheral portion and an inner peripheral edge joined with the respective inner peripheral portion.

4,090,287

WORKPIECE CHANGER MECHANISM FOR A MACHINE TOOL

Douglas S. Selander, New Berlin, Wis., assignor to Kearney & Trecker Corporation, West Allis, Wis.

Filed Jan. 28, 1977, Ser. No. 763,560
Int. Cl.[2] B23Q *3/157*
U.S. Cl. 29—568 **9 Claims**



1. A workpiece changer for a machine tool having a first and second beds;
a worktable mounted on said first;
a spindle rotatably mounted on said second bed opposite said worktable for rotation about a first axis and slideably mounted on said second bed for movement along said first axis toward and away from said worktable; and
means for moving said spindle along said first axis, said workpiece changer comprising:
a workpiece storage support mounted adjacent to said worktable on the side thereof opposite said spindle;
guide means on said worktable for slideably receiving a workpiece holder;
guide means on said workpiece storage support for slideably receiving a workpiece holder, said guide means on said worktable and on said workpiece storage support being dimensioned and positioned to permit a workpiece holder to be slid from said workpiece storage support to said worktable and from said worktable to said workpiece storage support along said first axis; and
a transfer bar dimensioned at one end to be clamped in said spindle and dimensioned at the other end to engage said workpiece holder for causing said workpiece holder to slide along said guide means when said transfer bar is clamped in said spindle and engaged with said workpiece

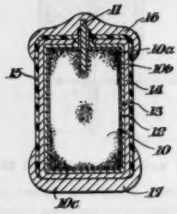
holder and said spindle is moved along said first axis toward or away from said worktable.

4,090,288

SOLID ELECTROLYTE CAPACITOR WITH METAL LOADED RESIN END CAPS

David Gale Thompson, Williamstown, Mass., and John Taylor Ogilvie, Bennington, Vt., assignors to Sprague Electric Company, North Adams, Mass.

Filed Mar. 15, 1976, Ser. No. 666,727
Int. Cl.[2] H01G 9/00
U.S. Cl. 29—570 9 Claims



1. A method for making a low cost miniaturized electrolytic capacitor including providing a porous valve-metal anode with one end face from which a wire of said valve-metal extends, an opposite end face and at least one side face continguous with said two end faces; forming a dielectric film over the surfaces of said porous anode; disposing a solid electrolyte over said dielectric film; and depositing a conductive counterelectrode layer overlying said solid electrolyte in a region over said at least one side face and extending over said opposite end face; wherein the improvement comprises:

(a) dipping said counterelectroded anode in an insulative liquid resin to form a coating of said resin over said side face and said two end faces;

(b) blotting said opposite end face to remove said resin coating therefrom;

(c) curing said resin

(d) forming a free-form conductive anode end cap of an organic resin containing metal particles directly over said insulative coating at said one end face making electrical contact with said anode wire; and

(e) forming a free-form conductive cathode end cap of an organic resin containing metal particles directly over and in contact with said opposite end face portion of said counterelectrode so that said conductive anode and cathode end caps are spaced from each other.

4,090,289

METHOD OF FABRICATION FOR FIELD EFFECT TRANSISTORS (FETS) HAVING A COMMON CHANNEL STOPPER AND FET CHANNEL DOPING WITH THE CHANNEL STOPPER DOPING SELF-ALIGNED TO THE DIELECTRIC ISOLATION BETWEEN FETS

Robert Heath Dennard, Croton-on-Hudson, and Vincent Leo Rideout, Mohegan Lake, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 18, 1976, Ser. No. 715,466
Int. Cl.[2] B01J 17/00
U.S. Cl. 29—571 14 Claims

1. A method of fabricating field effect transistors having a common channel stopper and FET channel doping with the channel stopper doping self-aligned with respect to the field dielectric isolation regions between transistors comprising the steps of

(A) increasing the impurity concentration of a semiconductive substrate of first conductive type near its surface by the step of doping by ion implantation or diffusion of impurities of a first conductive type,

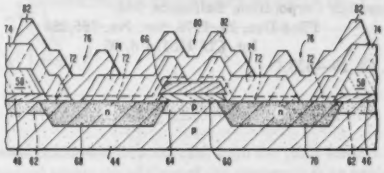
(B) then depositing a field dielectric isolation layer on said surface of the semiconductive substrate,

(C) then delineating predetermined regions to provide field dielectric isolation regions,

(D) forming an FET gate insulator layer over regions of the substrate not covered by field dielectric isolation regions,

(E) then forming a layer of electrically conductive material on the structure,

(F) delineating predetermined regions in the conductive material to provide FET gate electrodes,



(G) forming doped FET source and drain regions of a second and opposite conductivity type,

(H) forming an insulating layer over the structure,

(I) delineating predetermined contact hole regions to provide vias through the insulating layer to source, drain and gate of the FET,

(J) forming a metal layer on the structure, and

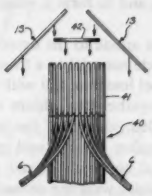
(K) delineating a predetermined metallic interconnection pattern in the metal layer.

4,090,290

METHOD OF MAKING AN ELECTRIC MOTOR WINDING INSULATING BARRIER

Norman D. Clark, Dayton, Ohio, assignor to A. O. Smith Corporation, Milwaukee, Wis.

Division of Ser. No. 383,123, Jul. 27, 1973, Pat. No. 3,909,648.
This application Jul. 29, 1974, Ser. No. 492,589
Int. Cl.[2] H02K 15/06, 15/10
U.S. Cl. 29—596 2 Claims



1. In a method of forming a wound stator core having a plurality of stacked stator laminations with aligned slots containing first and second coils with certain slots containing both first and second coils separated by insulating pegs and end turn insulators by the use of a disc element and a coil transfer apparatus having a movable stripper operable for transferring prewound coils into said slots, wherein the steps comprise inserting said first coils into predetermined ones of said winding slots, inserting said insulating pegs into predetermined ones of said slots including slots containing said first coils, placing said second coils on said coil transfer apparatus, placing said disc element upon said second coils located on said coil transfer apparatus, placing a plurality of said end turn insulators on said coil transfer apparatus over said disc element, and operating said movable stripper of said coil transfer apparatus to simultaneously transfer said end turn insulators and said second coils into predetermined ones of said slots with said disc element maintaining separation between said second coils and said end turn insulators being guided into said slots so that each slot containing said first and second coils contains at least one of

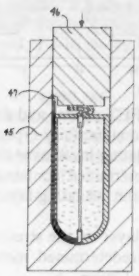
said insulating pegs and a portion of said end turn insulators between said first and second coils.

4,090,291

METHOD FOR ENCAPSULATING A CORROSIVE MATERIAL WITH LITHIUM

Alan Arthur Schneider, Baltimore, Md., assignor to Catalyst Research Corporation, Baltimore, Md.

Filed Dec. 29, 1976, Ser. No. 755,256
Int. Cl.[2] H01M 6/00
U.S. Cl. 29—623.1 5 Claims



1. A method for making lithium-halide cells comprising the steps of:

A. forming a lithium anode receiving vessel having a cathode lead embedded within the vessel by

(i) folding a lithium sheet in the form of said vessel,

(ii) positioning a cathode lead having insulation thereon within said vessel such that one end is within the vessel and extends between at least two folds of the lithium,

(iii) pressing the folds together to embed the cathode therebetween and to form a vessel having an open end and

(iv) attaching an anode to the exterior of the vessel;

B. heating a cathode material to a flowable consistency; and

C. filling said vessel less than full with said cathode material and pinching together the lithium vessel sides extending above the unfilled portion of the vessel to effect a cold weld and thereafter folding said pinched area into the cathode material to position said pinched fold area in coextensive contact with the cathode material.

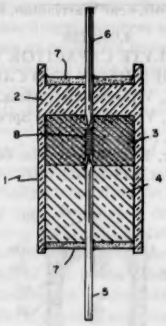
4,090,292

METHOD OF MAKING THERMAL FUSE

Warren H. Hay, Hamilton; Stephen F. Kimball, Georgetown, and Roy C. Martin, Salem, all of Mass., assignors to GTE Sylvania Incorporated, Danvers, Mass.

Division of Ser. No. 614,564, Sep. 18, 1975. This application May 6, 1977, Ser. No. 794,497
Int. Cl.[2] H01H 69/02
U.S. Cl. 29—623 1 Claim

1. The method of making a thermally responsive electric switch comprising the steps of cleaning the ends of two lead-in wires in dilute acid; adding mercury to the acid and allowing the mercury to come into contact with said wire ends intermittently until a smooth mirror coating of mercury is obtained thereon; washing and drying the wires; and forming said switch such that said mercury-coated ends of said lead-in wires extend slightly into each end of the axial hole of a cylindrical meltable pellet and are spaced apart from each other, a pool of



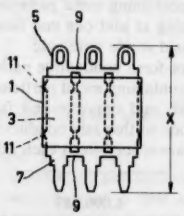
mercury filling said axial hole between said mercury-coated wire ends.

4,090,293

METHOD OF MANUFACTURING AN ELECTRICAL COMPONENT COMPRISING CONNECTION TAGS

Johannes Martinus Augustinus H. van der Donk, and Jacob Jan de Kok, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, Briarcliff Manor, N.Y.

Filed Dec. 16, 1976, Ser. No. 751,444
Claims priority, application Netherlands, Jan. 12, 1976, 7600236
Int. Cl.[2] H01R 43/00
U.S. Cl. 29—628 1 Claim



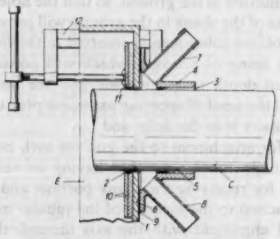
1. A method of manufacturing an electrical component comprising a housing of a synthetic material and at least one row of connection tags formed from a strip material, which comprises punching the strip material to form a comb or grid which contains the connection tags interconnected by connection pieces, forming the housing of synthetic material in such a manner that a portion of each of the connection tags is anchored in the housing while leaving a free end of each tag together with the connection pieces external of the housing, each connection piece extending between two adjacent connection tags and in its entirety being situated nearer to the housing than the ends of the connection tags, separating the connection tags by cutting each connection piece in only one location so that on at least one of every two adjacent connection tags at least one protrusion remains, and subsequently bending each protrusion to enclose an angle with the plane of the connection tags.

4,090,294

JOINTING OR TERMINATING PLASTICS SHEATHED ELECTRIC CABLE

David Turner Parr, Croft, near Warrington, England, assignor to BICC Limited, London, England

Filed Mar. 22, 1976, Ser. No. 669,330
Int. Cl.[2] B29C 5/00; B29F 1/00
U.S. Cl. 29—628 13 Claims



1. A method of connecting a cable comprising at least one conductor to an existing joint between plastics sheathed cables, or to an existing termination of a plastics sheathed cable, of the kind in which connections between the cable conductors of the terminated end of the cable conductor is surrounded by an enclosure divided transversely of the axis of at least one of the cables into at least two separately formed parts secured together in a fluid-tight manner, at least one of said separately formed parts of the enclosure being of plastics material and being sealed in a fluid-tight manner to the plastics sheath of the terminated cable or at least one of the jointed cables, wherein the enclosure is opened up to expose the existing joint or termination; a hole is formed in the wall of said plastics part of the enclosure to form a cable entry of a size appropriate to the additional cable; a length of the additional cable is passed through the cable entry so formed and its conductor is connected to at least one conductor of at least one of the cables or of the cable of the existing joint or termination; a mould is assembled about the additional cable adjacent a surface of said part, which mould embraces the additional cable and has ports for the admission and discharge of molten thermoplastics material; the mould is temporarily secured to said part; molten thermoplastics material is injected into the interior of the mould through said admission port, which thermoplastics material is compatible with the plastics materials of the cable sheath and said part of the enclosure and is at a temperature appreciably above the softening point of said materials; after a sufficient quantity of molten thermoplastics material has passed through the mould and out of the discharge port to soften the surfaces of the cable sheath and said part of the enclosure, the mould is sealed and the molten thermoplastics material in the mould is permitted or caused to cool and make an effective bond with the cable sheath and with said part of the enclosure; and the enclosure is re-closed.

4,090,295

APPARATUS FOR ASSEMBLING FORCE-FIT COMPONENTS

Romaine L. Renbarger, St. Marys, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jan. 14, 1977, Ser. No. 759,302
Int. Cl.[2] B23P 21/00
U.S. Cl. 29—789 11 Claims

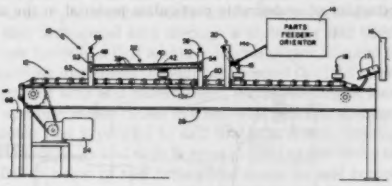
1. Appartus for force-fit assembly of a two component unit comprising:

A. an endless conveyor;

B. carrying means mounted on the conveyor at regular intervals along the length of the conveyor for accepting and carrying components;

C. a first parts feeder positioned relative to the conveyor for feeding a first one of the components to the carrying means on the conveyor;

D. a second parts feeder positioned relative to the conveyor for feeding the second of the components to the carrying means on the conveyor such that said second component is juxtopositioned with respect to the first of the components; and



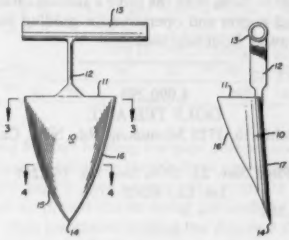
E. means positioned downstream from the parts feeders and mounted above the surface of the conveyor at an angle of declination in the direction of conveyor motion to provide a progressively increasing compressive force to said juxtopositioned components to join them into an integrally combined unit.

4,090,296

CABBAGE CORING TOOL

Philip Di Piero, 432 Elberen St., Youngstown, Ohio 44509

Filed May 23, 1977, Ser. No. 799,449
Int. Cl.[2] A47J 25/00
U.S. Cl. 30—113.1 2 Claims



1. A cabbage coring tool comprising a triangular shaped blade of cross sectionally arcuate shape and defining a semi-circle at its upper end and having both side edges of the blade of uniform taper to a sharpened point at its lower end, said side edges being sharpened, a shank having a triangular lower end, said triangular lower end of said shank being cross sectionally arcuate and joined to said upper end of said triangular shaped blade midway thereof and on an arc matching the arc of said upper end of said blade and a cross bar on the opposite end of said shank, said shank extending upwardly from said upper end of said blade at a slight angle rearwardly from the axial center of said blade.

4,090,297

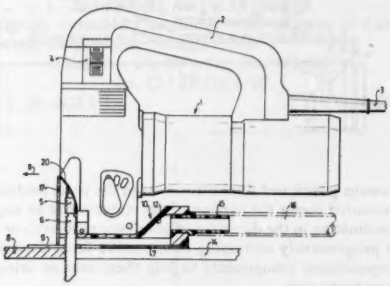
POWER TOOL WITH DUST COLLECTING ARRANGEMENT

Karl Wanner, Echterdinge; Kurt Paule, Stuttgart; Hermann Adam, Sielmingen, and Wilbert Reibetanz, Leinfelden, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Oct. 12, 1976, Ser. No. 731,342
Claims priority, application Germany, Oct. 17, 1975, 2546527
Int. Cl.[2] B27B 11/02, 19/09
U.S. Cl. 30—124 12 Claims

1. In a hand-guided power tool, a combination comprising a

housing having a leading end, as considered with respect to the direction of advancement of the power tool relative to the object, which is open to the ambient atmosphere and to said circumambient region of said element; a base plate mounted on said housing and having a slot, said base plate being adapted to be juxtaposed with an object from which material is to be removed; a tool element extending through said slot and operative for removing material from the object with concomitant production of undesirable particulate material in the circum-



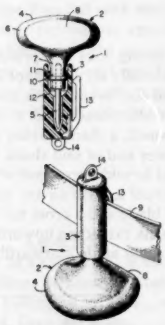
ambient region of said tool element; a hood member mounted at said open leading housing end for substantially closing the latter to thereby confine the particulate material substantially to said circumambient region of said element; and means for removing said particulate material directly from said region, including a channel-defining member mounted intermediate said housing and said base plate, and being spaced from said base plate so as to form with the same a suction channel which extends to said region and operative for guiding said particulate material away from said tool.

4,090,298

GOLF TEE AWL

Harold E. Rushforth, 1918 Monument Rd., NW., Canton, Ohio 44709

Filed Nov. 23, 1976, Ser. No. 744,245
Int. Cl.[2] B26F *1/00*
U.S. Cl. 30—368 **4 Claims**



1. The combination of a golf tee awl for making holes in the ground for inserting golf tees, and a sheath, comprising:

a handle portion to be held in the hand of the user;

the handle portion having a palm contacting surface on one end thereof against which pressure may be exerted by the palm of the hand of the user, the transverse shape of the handle being substantially circular with a truncated portion at one location on the circumference thereof parallel to the longitudinal axis of the handle; and

an axial shank portion having one end thereof attached to the handle portion at the end opposite the palm contacting surface;

the opposite end of the shank portion having a sharpened point to provide ease of penetration into the ground when pressure is exerted against the palm contacting surface of the handle portion;

the shank portion being of a diameter slightly smaller than the average diameter of a golf tee at the portion of the tee that is inserted in the ground, so that the hole produced by insertion of the shank in the ground will provide a force fit for a golf tee subsequently inserted in the hole;

the shank being of a length which will produce a hole of sufficient depth to receive the golf tee inserted therein without the need of applying excessive pressure to the golf tee to insert it in the hole; and

a sheath for attachment to the golf tee awl, comprising:

a substantially tubular member having an axial receptacle therein for receiving the shank portion; and

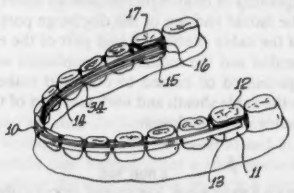
a clip attached to the exterior of the tubular member and in parallel alignment with the axis thereof, the clip being vertically aligned with the truncated portion of the handle to permit the awl to fit comfortably snugly against the hip of a person wearing a belt with the awl carrying sheath attached thereto and the truncated portion facing toward the person's hip, the sheath and awl having frictional cooperative retaining means for holding the awl in the sheath and permitting manual removal of the awl from the sheath while clipped to the belt by a simple, linear force on the handle directed away from the sheath in a line of movement coincident with the axes of the handle, shank portion, and receptacle, and parallel to the hip of the said person, the truncated handle portion permitting smooth sliding movement along the body of the said person.

4,090,299

ORTHODONTIC APPLIANCE

Richard E. Williams, 6284 Bullion Blvd., Las Vegas, Nev. 89103

Filed Apr. 25, 1977, Ser. No. 790,305
Int. Cl.[2] A61C *13/00*
U.S. Cl. 32—14 A **3 Claims**



1. An orthodontic appliance comprising:

an arcuate labial bar shaped to generally comform to the outer surface of a row of teeth; and

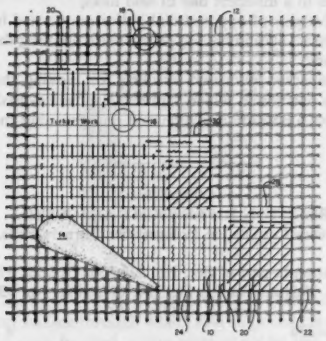
an arcuate lingual bar shaped for positioning on the inner surface of said row of teeth and affixed to said labial bar by attachment means, said attachment means being adapted to urge said lingual bar and said labial bar against said row of teeth; and

cooperating ratchet means affixed to the outer extremities of said bars and adapted to pass around the distal surface of a tooth near each extremity of each bar.

4,090,300
ORNAMENTAL FABRIC

Josephine Vicari Massucci, 2725 Beechwood Blvd., Pittsburgh, Pa. 15217, and Rosemary Anne Parlak, 7116 McClure Ave., Pittsburgh, Pa. 15218

Filed Oct. 7, 1976, Ser. No. 730,469
Int. Cl.[2] A41H *1/00*
U.S. Cl. 33—1 R 6 Claims

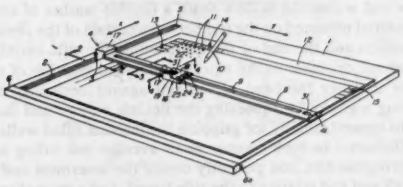


1. An apparatus for needlepointing a selected pattern comprising:
a canvas;
a grid pattern defined by said canvas;
a guide formed of a flexible material;
means for removably attaching said guide to a portion of said canvas and adapted for removal after a particular pattern is established by needlepointing Stitches on said canvas; and,
said guide having indicated thereon a gird of the same size as the grid defined by said canvas, said guide having further indicated thereon the Stitches and locations of Stitches to be needlepointed on said canvas to form a selected stitch pattern.

4,090,301
GRAPHIC RECORDING SYSTEM

F. Peter Della Monica, 43 Riverview Ave., Danvers, Mass. 01923

Filed Jul. 28, 1977, Ser. No. 819,664
Int. Cl.[2] B43L *5/00, 13/00*
U.S. Cl. 33—76 R 5 Claims

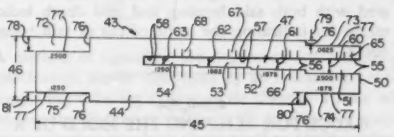


1. A recording device for enabling a user unskilled in the mathematical arts to prepare a graph of a function of time, comprising a base, means forming a first elongated slot in said base extending along a first coordinate axis, a slide having a second slot, means formed on one end of said slide and engaging said first slot for cantilever mounting of said slide for movement on said base aong said first coordinate axis a scale on said slide, said scale extending normal to said first axis, a cursor, means slidably mounting said cursor on said slide for movement therealong in directions normal to said first axis, a record sheet mounted on said base and formed with indicia comprising a blank scale and a preinscribed scale running along orthogonal axes one of which is parallel with said first axis, said preinscribed scale being formed with perceptible indicia in uniform increments of an independent variable, said blank scale being formed with perceptible indicia indicating regions adapted to be marked with a scale of values of a dependent variable, means forming perceptible coordinate indicia denoting regions on said record sheet at each intersection along a line parallel with one of said orthogonal axes through a value on said preinscribed scale with a line parallel to the other of said orthogonal axes through a region on said blank scale, means forming a first aperture in said cursor adapted to admit a marking implement through said second slot into marking engagement with said record sheet, means forming at least a second aperture in said cursor in a line with said first aperture in said cursor that is parallel to said first axis, means forming perceptible indicia on said slide in rows normal to said first axis and parallel to a first of said orthogonal scales on said record sheet to facilitate alignment of said cursor with said first scale, and means forming another aperture serving as a window in said cursor adapted to be aligned with a desired location on the other of said orthogonal scales in one extreme position of said cursor on said slide.

4,090,302
PRINTING BLANKET HOLDING BAR GAGE

Jacob A. Bollmer, Dayton, Ohio, assignor to Dayco Corporation, Dayton, Ohio

Filed Mar. 17, 1977, Ser. No. 778,768
Int. Cl.[2] G01B *3/30*
U.S. Cl. 33—168 B 8 Claims



1. A printing blanket holding bar gage comprising a flat strip having a stepped slot defined therein from one edge thereof for receipt of a holding bar, and a rectangular cutout in at least one corner of said strip, said cutout being particularly adapted to receive a leg of an associated holding bar disposed therewithin, said slot being comprised of a plurality of aligned slot portions each defined by an associated spaced pair of parallel edges having a particular perpendicular distance therebetween with the perpendicular distance between each associated spaced pair of parallel edges being less in each consecutive slot portion disposed inwardly from said edge enabling said edge to be moved into gaging relation with a holding bar and serve as a go no-go gage therefore, and said cutout being defined by an end edge and a bottom edge wherein said end edge has a precise known height which serves as a comparator gage for a leg of an associated holding bar brought into gaging association therewith, said gage further comprising measuring scales provided on said strip along at least one of the edges of each associated spaced pair of edges, each of said scales beginning at one end of each of said slot portions for measuring the width of an immediately adjacent portion of an associated holding bar disposed in said slot portion.

4,090,303
KEY DECODING APPARATUS

Tim M. Uyeda, South San Gabriel, Calif., assignor to La Gard, Inc., Torrance, Calif.

Division of Ser. No. 582,639, Jun. 2, 1975, Pat. No. 4,012,991.
This application Apr. 22, 1976, Ser. No. 679,169
Int. Cl.[2] G01B *3/28, 5/20*
U.S. Cl. 33—174 F 5 Claims

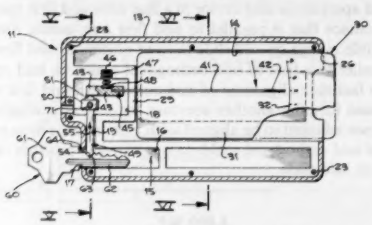
1. Apparatus for decoding a key having a shank portion with a plurality of spaced transverse notches of differing depths,

said key having a predetermined coded depth of said notches, said apparatus comprising:

housing means for receiving coded indicia bearing means therein;

coded indicia bearing means insertable in said housing means having indicia thereon corresponding to a sequential index related to the predetermined coded depth of the notches of said key;

key shank portion recieving means on said housing for receiving the shank portion of said key therein in a predetermined position thereon; and



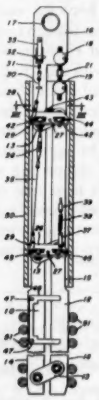
coded notch depth indicating means pivotally mounted on said housing having a first portion conforming to said notches in said shank portion and a second portion movable across said sequential index to thereby indicate the coded depth of one of said notches of said shank portion when said first portion is conformably received in said one of said notches, and angle-of-cut indicating means associated with both said housing and said depth indicating means for indicating the angle of cut of said transverse notch.

4,090,304

GAUGE FOR ALIGNING THE MOLD OF A CONTINUOUS-CASTING MACHINE WITH A GUIDE ROLL-RACK

James G. Bradley, Center Township, Porter County, Ind., and Wilmer C. Wrhen, Cranberry Township, Venango County, Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

Filed Mar. 11, 1977, Ser. No. 776,572
Int. Cl.[2] B21B *31/34*
U.S. Cl. 33—182 **5 Claims**



1. A gauge for aligning the mold of a continuous-casting machine with a guide roll-rack beneath the mold, said gauge comprising:

a pair of elongated bars, a plurality of connecting links, and means pivoting said links to said bars forming a parallelogram;

said bars having portions with straight side edges for abutting the rolls of a guide roll-rack and portions of reduced width to lie within a mold;

means connected to said bars for adjusting the spacing therebetween;

first and second brackets, and means pivoting each of said brackets to a different one of said links;

a respective pair of opposed dial indicators carried by each of said brackets and having plungers for abutting the mold walls; and

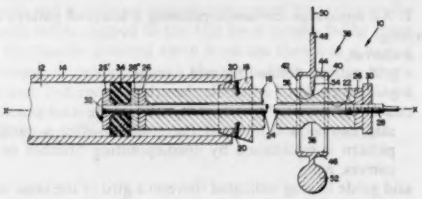
means connected with said brackets for moving them between a position in which said bars can be lowered into a mold and a position in which said plungers abut the mold walls.

4,090,305

PRECISION RIFLE SIGHT ADJUSTER

James Lawrence Cassidy, 66 Prospect St., Turners Falls, Mass. 01376

Continuation-in-part of Ser. No. 624,656, Oct. 22, 1975, abandoned. This application Oct. 14, 1976, Ser. No. 732,302
Int. Cl.[2] F41G *1/54*
U.S. Cl. 33—234 **4 Claims**



1. In combination with a rifle having a sight, an instrument for the precise adjustment of the vertical collimation of the line of sighting comprising, a hollow shaft to be inserted part way into the bore of a rifle barrel at the muzzle end, accurately centered therein and extending forwardly therefrom, at least one counterbalance module supported on the shaft and having an index pointer extending vertically upwardly into the field of vision of the line of sighting, and means for centering the shaft within the rifle barrel comprising a rod extending axially through the length of the hollow shaft having a head at one end and an external threaded portion at its opposite end, centering washers disposed at opposite ends of the rod for centering the rod within the hollow shaft, a flexible washer of resilient material mounted on the rod between certain of the centering washers and the end of the shaft within the rifle barrel, a knurled nut operable at the external threaded position of the rod for drawing the head of the rod against certain of the centering washers for squeezing the flexible washer and causing it to expand radially for gripping the internal rifled walls of the rifle barrel in such manner as to average out rifling and other irregularities, and perfectly center the innermost end of the shaft and rod relative to the rifle barrel, and a cone shaped collar on the shaft having its tapered lesser diameter end inserted into the rifle barrel for providing a second centering support point.

4,090,306

MAGNIFIED DIAL LEVEL INDICATOR WITH MAGNETIC SWING PLATE

Donald R. Darden, 519 Corday St., Lot 3, Pensacola, Fla. 32503

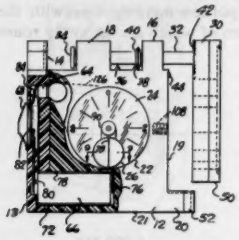
Filed Jan. 28, 1977, Ser. No. 763,606
Int. Cl.[2] G01C *9/12*
U.S. Cl. 33—391 **34 Claims**

1. A level, which comprises:

a main body casing having a pair of mutually perpendicular

planar measuring surfaces disposed as the outer edges thereof;

means centrally disposed in said casing for indicating the angle of inclination of said measuring surfaces with respect to the vertical which comprises an angle indicia bearing dial plate fixed within said casing and pendulum means freely pivotable with respect to said dial plate about a measurement axis and having a magnifying lens with a



planar inner surface adjacent said dial plate and a convex outer surface through which said angle indicia on said dial plate may be read, a thin vertical scribe line being positioned on said convex outer surface and a second vertical scribe line thinner than said thin vertical scribe line positioned on said planar inner surface for reducing parallax error when said indicia are being read; and

means for selectively positioning one of said surfaces either adjacent said casing or laterally offset therefrom.

4,090,307

METHOD FOR REMOVING WATER FROM WORKPIECES AND APPARATUS THEREFOR

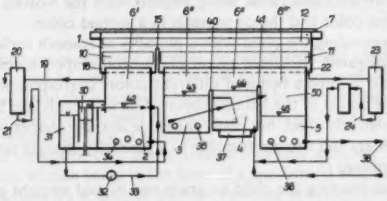
Hans-Joachim Golimick, Kelkheim; Karl Klinkhart, Erzhausen; Herbert Morzinek, Nauheim; Wolfgang Bereiter, Babenhausen, and Walter Rosenstock, Frankfurt am Main, all of Germany, assignors to Schoeller & Co. and Elektrotechnische Fabrik GmbH & Co., Frankfurt am Main, Germany

Filed Oct. 21, 1976, Ser. No. 734,436

Claims priority, application Germany, Oct. 25, 1975, 2547891; Sep. 25, 1976, 2643330

Int. Cl.² F26B *3/00*

U.S. Cl. 34—9 **9 Claims**



1. A method for removing water from the surface of a glass workpiece comprising the steps of:

(a) dipping the workpiece into a dewatering bath composed of an organic solvent which is immiscible with water and a surface active agent said bath being at the boiling temperature whereby a water layer is formed in the bath;

(b) thereafter rinsing the workpiece in a second bath composed of the pure organic solvent to remove the surface active agent adhering to the surface of the workpiece;

(c) drying the workpiece;

(d) condensing vapors formed from the dewatering bath, removing water therefrom, and returning the water-free condensate to the dewatering bath;

(e) removing the water layer from the dewatering bath;

(f) separating any remaining solvent from the removed water layer and returning said remaining solvent to the dewatering bath and,

(g) separately condensing vapors for the second bath, removing water from said condensed vapors, and returning the water-free condensate to the second bath.

4,090,308

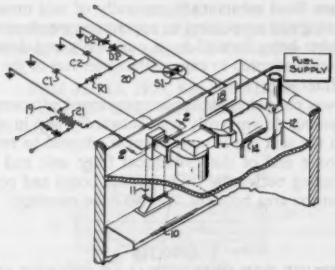
METHOD AND APPARATUS FOR SIGNALLING CONCENTRATION OF AIR CONVEYED IONIZABLE FOREIGN MATTER

Robert M. Stuck, Charlotte, N.C., assignor to Aero-Dyne Manufacturing, Inc., Charlotte, N.C.

Filed Aug. 4, 1975, Ser. No. 601,459

Int. Cl.² F26B *3/04*

U.S. Cl. 34—32 **17 Claims**



1. A method of signalling the degree of concentration of ionizable foreign matter conveyed by an entraining air flow and comprising inducing a flow of air through a zone while entraining ionizable foreign matter in the air flow and conveying the entrained matter from the zone, then passing at least a portion of the air flow and conveyed matter through an ionization detector spark gap while maintaining a continuous arcing electrical discharge across the gap, and monitoring the electrical conductivity of the discharge whereby fluctuations in the concentration of ionizable foreign matter conveyed from the zone are indicated by fluctuations in the monitored discharge conductivity.

4,090,309

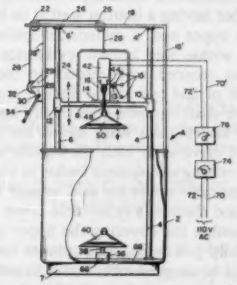
FILTER DRYING APPARATUS

James E. Rollins, 2150 Poplar Ridge Rd., Pasadena, Md. 21122

Filed Jan. 12, 1977, Ser. No. 758,820

Int. Cl.² F26B *19/00*

U.S. Cl. 34—58 **3 Claims**



1. A centrifugal drying apparatus for spinning cylindrical

filter units for dispensing moisture therefrom, comprising in combination:

a. a base;

b. a frame supported upwardly from the said base and comprising at least two spaced vertical standards;

c. a cross bar extending substantially horizontally between the spaced frame members having means at each end thereof for slideably engaging the said standards;

d. said frame extending upwardly and terminating in a substantially horizontal plane above the plane of the cross bar;

e. means for adjustably supporting the cross bar at predetermined levels along the frame members comprising a movable cable having one end thereof fixed centrally of the cross bar;

f. the opposite end of the said cable extending upwardly and over one or more pully means to a point adjacent one side of the apparatus, said opposite end of said cable having means for moving said cable in opposite directions, and means for temporarily locking said cable at selected positions;

g. means fixed substantially centrally of said cross bar for spinning and supporting an upper cone member, said cone member being formed in an outwardly and downwardly direction adapted to engage the outer rim of the cylindrical filter unit;

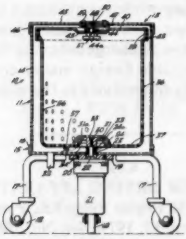
h. a lower cone shaped member positioned adjacent the base extending downwardly and outwardly and in alignment with the said upper cone element adapted to receive the opposite end of the cylindrical filter unit and a casing extending outwardly from the said cones and completely about the area between the two cone members.

4,090,310

CENTRIFUGE FOR DRYING SALAD GREENS AND THE LIKE

William Koff, 2100 S. Ocean La., Ft. Lauderdale, Fla. 33316

Filed Feb. 14, 1977, Ser. No. 768,084
Int. Cl.[2] F26B *17/24*
U.S. Cl. 34—58 **7 Claims**



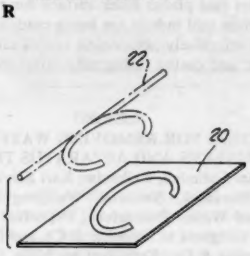
1. A centrifuge for drying salad greens and the like, comprising, in combination, a vertically-extending, hollow cylindrical body member having a bottom wall at its lower end and being open at its upper end, a cylindrical spinner basket coaxially receivable within said hollow cylindrical housing member, drive means secured with respect to the underside of said bottom wall of said cylindrical housing member and having a rotary drive shaft extending vertically upwardly through an opening in said bottom wall, means for releasably interconnecting said drive shaft with the bottom wall of said spinner basket for rotating said spinner basket in unison with said drive shaft, a removable cover for said spinner basket for covering the upper end thereof, a removable cover for said cylindrical housing member for covering the upper end thereof, mechanism coaxially journalling said spinner basket cover with respect to said housing member cover to permit rotation of said spinner basket cover independently of said housing member cover, said basket cover and said housing cover each having downwardly projecting peripheral skirt portions adapted to snugly embrace upper marginal end portions at the outsides of said spinner basket and said housing member, respectively, and drainage openings in said spinner basket and said cylindrical body member bottom walls for draining centrifuged water to the outside, said drive shaft interconnecting means comprising an octagonal drive cap secured to the upper end of said drive shaft, and a complementary octagonal recess in the bottom wall of said spinner basket, said octagonal drive cap being integrally formed and comprising a bottom section having mutually parallel opposite side walls and a comparatively long frustoconical portion merging therewith the lines of planar surface junction of which are smoothly rounded.

4,090,311

METHOD AND APPARATUS FOR TEACHING DYSLEXIC CHILDREN

Dorothy Flentie Lyons, 646 Morongo Rd., Palm Springs, Calif. 92262

Filed Jun. 7, 1976, Ser. No. 693,319
Int. Cl.[2] G09B *17/00*
U.S. Cl. 35—35 R **5 Claims**



1. A method of teaching a dyslexic child to form correct mental images of letters of the alphabet and the numbers from one to twenty, comprising the steps of:

(a) exposing to the sight of a dyslexic child a card from a set of cards, each having imprinted thereon a letter from the alphabet, said cards being printed with the vowels in a first color and the consonants in a second color;

(b) providing the child with a plurality of smooth surfaced, elongated, yieldable pliant plastic rod-shaped members, said members being of different colors corresponding to the colors of the letters imprinted on said cards and being relatively rigid, but easily formable into the shapes of the letters and being returnable to a generally straight configuration;

(c) instructing the child to grasp one of said straight members with his fingers and carefully bend said member into the shape of a symbol letter of the same color imprinted on one side of said card;

(d) encouraging the dyslexic child to feel with his fingers the shape of the symbol thus formed;

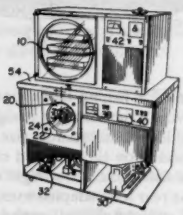
(e) instructing the dyslexic child to turn said card over and while feeling the symbol which has been formed study the appearance of the symbol as printed on said opposite side of said card; and

(f) repeating said aforementioned steps until each card in the set has been exposed and a plastic member has been formed into the shape of the symbol on each said card whereby the dyslexic child can correlate within his mind the visual appearance and "feel" of said symbols.

4,090,312
FREEZE DRYER PARTICULARLY ADAPTED FOR FREEZE DRYING MATERIALS HAVING HIGHLY CORROSIVE VAPORS

Douglas S. Fraser, New Paltz, N.Y., assignor to FTS Systems, Inc., Stone Ridge, N.Y.

Filed Oct. 4, 1976, Ser. No. 729,593
Int. Cl.[2] F26B *13/30*
U.S. Cl. 34—92 9 Claims

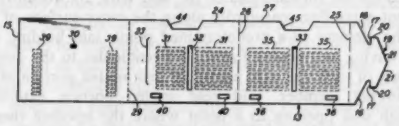


1. A condenser chamber adapted for use with a freeze dryer, said condenser chamber spun molded from a chemically resistant material in a generally cylindrical shape and having an exterior wall of any desired diameter, a pair of removable end caps closing said chamber, means mounting said chamber on said freeze dryer, said mounting means supporting the exterior wall of said chamber substantially continuously around the circumference thereof to maintain said chamber in said cylindrical shape under the application of high vacuums to an interior of said chamber, thereby preventing collapse of said chamber.

4,090,313
MANUALLY ASSEMBLABLE SLIDE CHART WITH INTEGRAL SELF-LOCKING TAB

Henry Clifton Morse, 345 Fullerton Pkwy., Chicago, Ill. 60614

Filed Jan. 10, 1977, Ser. No. 758,196
Int. Cl.[2] G09B *1/28*
U.S. Cl. 35—75 2 Claims



1. For use as a calorie counter, an elongated card adapted to be supplied in strip form with soft drinks, packages of food products and the like and to be assembled by the purchaser into a slide chart to be used to count the calories of the product with which the card is supplied,

said elongated card being divided into four sections,

a first section being in the form of a pre-formed lock characterized by a tapered portion tapering inwardly from the sides of the card at equal angles with respect to each other and with respect to the center line of the card and terminating into laterally outwardly extending shoulders,

said shoulders terminating into parallel sides extending longitudinally outwardly from said shoulders equal distances and terminating into tapered ends converging to an apex and forming the apex of said pre-formed lock,

a third section of the card having a transverse slit through which the pre-formed lock may be inserted,

a transverse fold line extending across said card inwardly of the tapered sides thereof and about which the pre-formed lock may be folded for locking a second section of the card in folded relation over a third section of the card to form a slide,

a fourth section of the card forming a slide card and defined at its inner end by a score line extending across the third section and along which the slide card may be manually detached from the card,

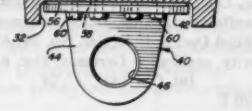
said slide card having a generally central marker on each side thereof,

one marker being longitudinally displaced relative to the other, and the second and third sections of the card forming a slide having transverse slots extending thereacross, longitudinally displaced with respect to each other when one section is folded over the other and each being in alignment with a marker on an adjacent side of the slide card when in place in the slide, rendering it necessary to place the slide card in the proper position in the slide to enable said markers to be viewed through said slots on each side of the slide.

4,090,314
SCRAPER BOWL LIFTING BRACKETS

Gary E. Mason, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jul. 13, 1977, Ser. No. 815,385
Int. Cl.[2] E02F *9/24;* B66C *1/10*
U.S. Cl. 37—124 8 Claims



1. In a lifting arrangement for a push frame and scraper bowl assembly, the push frame of said assembly having forwardly extending side legs connected to the lower portion of the scraper bowl, and the scraper bowl of said assembly having side walls and a socket located substantially in the midportion of each side wall normally used to mount other scraper bowl components when assembled in an operative condition, said socket having equally spaced, tapped holes around the outer periphery thereof, in combination, first bracket means secured in one of said sockets in said bowl in the absence of said other bowl components, and second bracket means secured to one of said side legs of said push frame whereby lifting equipment connected to said first and second bracket means can be used to lift said push frame and scraper bowl assembly in a balanced, substantially level, altitude and alternatively serving as tie-down engagements during transport of the assembly.

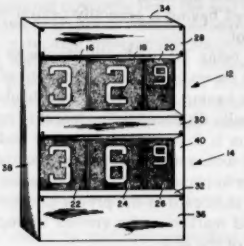
4,090,315
DISPLAY WITH MOVABLE INDICIA

Asa V. Brown, Jr., Royston, and James Marshall Suttles, Elberton, both of Ga., assignors to Hopeman Brothers, Inc., New York, N.Y.

Filed Mar. 23, 1977, Ser. No. 780,677
Int. Cl.[2] G09F *11/24*
U.S. Cl. 40—518 14 Claims

1. A support for use in a movable indicia display comprising a series of at least three substantially identical panels arranged in edge-to-edge adjoining relationship in a plane, each panel having a first guide channel formed along one edge and located on one side of the plane and a second guide channel formed

along the opposite edge and located on the other side of the plane, the non-adjacent guide channels of adjoining panels



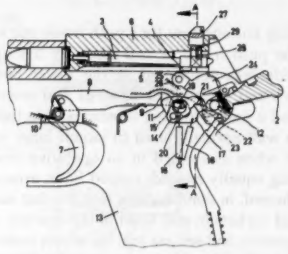
facing each other to provide a guide for the opposite edges of indicia-carrying means located therebetween.

4,090,316

FIRING PIN SAFETY DEVICE FOR HAND FIREARMS

Willi Volkmar, Ulm, Donau, Germany, assignor to Carl Walther, Sportwaffenfabrik, Ulm, Donau, Germany

Filed Dec. 6, 1976, Ser. No. 747,478
Claims priority, application Germany, Dec. 6, 1975, 2554955
Int. Cl.[2] F41C *17/04*
U.S. Cl. 42—70 F **9 Claims**



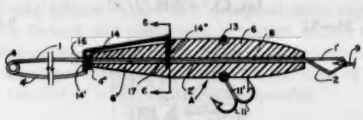
1. A safety device for the firing pin of a hand firearm comprising a firing pin pivotable between a safety position and a firing position, a pivotally mounted hammer having a striking surface engageable with said firing pin when in its firing position and a recess receiving said firing pin when in its safety position, said hammer being pivotable between cocked and uncocked positions, a first pivotally mounted cocking lever having a portion thereof engageable with said hammer when in the cocked position to maintain said hammer in said cocked position, a pivotable release lever having a first position and a second position engageable with said firing pin to pivot said firing pin to the firing position, a second pivotally mounted cocking lever having a portion thereon engageable with said release lever, detent means on said second and first cocking levers successively positioned from said hammer in the cocked position of the hammer such that said first cocking lever being disengageable from said hammer to release the hammer from its cocked position without pivoting said release lever to its second position such that said firing pin remains in its safety position.

4,090,317

CONNECTING LINK FOR FISHING TACKLE

Paul T. Skwirut, 2233 Searles Rd., Baltimore, Md. 21222

Continuation-in-part of Ser. No. 570,738, Apr. 23, 1975, abandoned. This application Oct. 21, 1976, Ser. No. 734,417
Int. Cl.[2] A01K *85/00*
U.S. Cl. 43—42.36 **5 Claims**



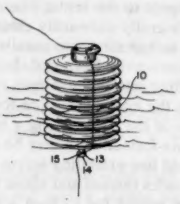
1. A connector link for fishing tackle comprising an elongated single wire having a substantially straight central section and an open-side end loop of substantial size having a straight outer end portion formed on the rear end of the wire for receiving a bait and/or fish hook, the straight outer end portion of the open side of the rear loop adapted to extend substantially parallel adjacent the straight central section of the wire for a substantial distance and an opensided end loop at the forward end of the wire for receiving a fishing line, the outer end of the open side of the forward end loop having means for engaging the straight section of the wire, a holding element of substantially one-half the length of the straight section of the wire having a single aperture extending substantially along the longitudinal axis thereof and receiving the straight section of the wire and the free parallel portion of the end of the rear loop, the means on the outer free end of the forward loop for engaging the straight section of the wire being of such length as to engage the straight section of the wire in front of the holding element when the holding element is in its rearward position, an elongated reenforcing element extending over at least the forward end of the holding element having a forward angled section, a substantially straight center section and an angled rear section, said angled sections being formed at right angles to the straight section of the wire including apertures extending through each of the ends of the angled sections of such size as to slideably receive the said wire, the front angled end of the reenforcing member adapted to slideably engage the straight section of wire in front of the wire engaging means formed on the forward end of the said wire, the reenforcing element extending rearwardly along the outer surface of the holding element to a predetermined point, said holding element having an opening formed perpendicular to the central aperture of such size as to admit the rear angled portion of the reenforcing member, said rear angled portion extending through said opening to a point where the opening therein engages the straight section of the wire extending through the elongated central aperture of the holding element.

4,090,318

ADJUSTABLE BUOYANCY FISHING BOBBER

Ronald F. Webster, 14706 Beachview Ter., Dolton, Ill. 60419

Filed Nov. 26, 1976, Ser. No. 745,008
Int. Cl.[2] A01K *93/00*
U.S. Cl. 43—43.14 **2 Claims**



1. An adjustable buoyancy fishing bobber comprising a hollow cylindrical resilient body portion with accordian

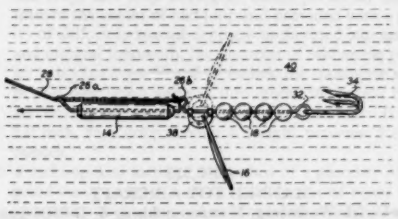
pleated sides its entire length and closed at one end, an axial post extending from said closed end, said post having a transverse opening therethrough for threading a fish line through said opening, the other end having an axial threaded neck projecting therefrom, a two-part cap, one part being screw-threadedly applicable to said neck to seal said neck, a lip extending about the rim of said part, and a second part shaped to snap on and off the lip upon application of sufficient pressure, and providing means to clamp said fish line therebetween and hold said bobber in place on said line, whereby the cap may be loosened, the bobber body compressed along its accordian pleats to the desired buoyancy, and held in that position by screwing the cap down to seal the neck.

4,090,319

FISHING LURE

Henry S. Wolfe, Clearwater, Fla., assignor to American Clearwater Corp., Clearwater, Fla.

Filed Jan. 3, 1977, Ser. No. 756,434
Int. Cl.[2] A01K *85/00*
U.S. Cl. 43—42.19 **5 Claims**



1. In a spinner type fishing lure having an elongated shaft, means for securing a hook to the shaft substantially at the rear end thereof, a rotatable hydrodynamically designed spinner blade supported on the shaft for rotation about the axis thereof as said lure is drawn through a liquid and said liquid hydrodynamically flows over said spinner blade, and means secured to the shaft intermediate the spinner blade and the hook supporting means for spacing the blade from the hook when the hook is secured to the shaft, the improvement comprising:

first substantially rigid support means extending upwardly from said shaft substantially at the front end thereof for providing a first substantially rigid support point for said lure on a fishing line;

second substantially rigid support means extending upwardly from said shaft between said first substantially rigid support means and said spinner blade for providing a second substantially rigid support point for attachment of said lure on said fishing line; and

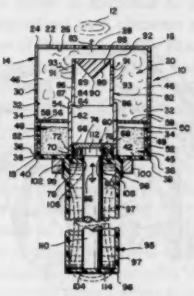
a weighted member secured to said shaft intermediate said first and second support points and disposed thereon for providing substantially the entire weight of said lure between said first and second support points for enabling a true keel effect occurrence for said weight disposed below said first and second support points, said first and second support means being disposed on said shaft for providing a substantially wobble-free hydrodynamic positional relationship for said spinner blade during retrieve of said lure and a substantially horizontal orientation for said lure when tension is applied to said fishing line during said retrieve for enabling substantially uniform hydrodynamic flow over said spinner blade during said retrieve of said lure; whereby high speed, free swinging rotation of said spinner blade is enhanced and twisting of said fishing line during said retrieve is minimized.

4,090,320

SMOKE RING BOX

Carmelo Loiacono, 442 Third Ave., New York, N.Y. 10016

Filed Jul. 19, 1976, Ser. No. 706,158
Int. Cl.[2] A63H *33/28;* A24F *13/30*
U.S. Cl. 46—9 **3 Claims**



1. A smoke ring device, comprising:

A. a housing having an outlet at the upper end thereof,

B. smoke generating means having fine powder therein communicating with said housing in spaced relation to said outlet with an air passage therebetween,

C. said smoke generating means including:

i. a container having said fine powder contained therein, and

ii. a screen extending over the open end of said container to limit the amount of powder released therefrom,

D. pumping means in said housing for manually obtaining an air current flow relative to said fine powder in said container to form puffs of powder in said air passage,

E. said pumping means including:

i. a vertically extending cavity, and

ii. a piston mounted in said cavity for reciprocation in said cavity to obtain the air current flow,

F. deflecting means mounted within said housing adjacent said outlet and communicating with said air passage for creating air turbulence in a direction to force a puff of powder outwardly through said outlet such that a puff of powder is formed into a ring when exiting from said outlet,

G. handle means operatively associated with said housing and comprising:

i. an elongated hollow handle extending from the bottom of said housing and in axial alignment with said vertically extending cavity,

ii. a plunger axially extending within said handle and secured at one end thereof to said piston, and

iii. a fluid contained within said hollow handle, such that compression of said handle forces said plunger to move upwardly from within said handle to advance said plunger, and

H. said deflecting means including:

i. a duct in communicating relation with said cavity,

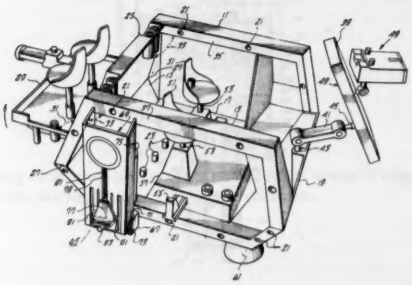
ii. a deflector positioned at one end of said duct, and

iii. a plurality of radially extending apertures adjacent said deflector, such that as said piston is reciprocated by compression of said handle and moves forward, air currents are created that flow outwardly through said apertures.

4,090,321
ANIMATED RECONFIGURABLE COMMAND STATION TOY

Iwakichi Ogawa, Kashiwa, Japan, assignor to Takara Co., Ltd., Tokyo, Japan

Filed Jun. 9, 1976, Ser. No. 694,192
Int. Cl.[2] A63H *33/42*
U.S. Cl. 46—12 10 Claims

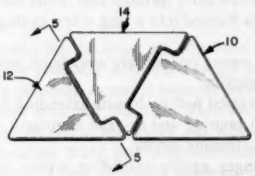


1. A toy space station assembly comprising;
a base floor member;
a pair of side frame members extending upward from said floor member;
at least one lower wall member extending between said side frame members adjacent said base floor member; and
an upper wall assembly, pivotally mounted at an axis, through the midpoints of its sides to each side frame member and positioned above said lower wall member, having a first platform member connected to and extending from said upper wall assembly, said first platform member being relatively disposed to said upper wall assembly so as to permit the lower surface of said first platform member to extend across the top surface area between the side frame members when the upper wall assembly is rotated about an axis.

4,090,322
GEOMETRIC AMUSEMENT SET

David Frederick Hake, 832 Glenstone Ct., Trotwood, Ohio 45426, assignor to David F. Hake, Trotwood, Ohio

Filed Oct. 28, 1976, Ser. No. 736,545
Int. Cl.[2] A63H *33/10*
U.S. Cl. 46—25 1 Claim



1. A geometric building and amusement set comprising a plurality of generally equilateral triangularly cross sectioned pieces having substantially flat parallel upper and lower surfaces joined by side surfaces disposed substantially perpendicular to the upper and lower surfaces, the set having three distinctly shaped groups of pieces which can be assembled to form three dimensional geometric figures;

a. a first group of pieces having formed on a first side surface a generally rectangular male connector protruding outwardly therefrom and forming a major widthwise extent of said first side surface and having pivotal joining means formed on opposite ends of the male connector, a generally rectangular female connector recess formed in a second side surface and proportioned to accept a male connector of an adjacent piece and having cooperating pivotal joining means releasably engageable with the corresponding joining means formed on a male connector of an adjacent piece, said joining means comprising a protuberance formed in each end portion of the female connector recess and a corresponding recess formed in each end of the male connector, the protuberances and corresponding recesses forming the pivotal axis of adjacent connected pieces and so formed as to permit at least 180° of relative rotation, and a third continuously flat side surface free of functional discontinuities therein and of any means for interconnecting with other pieces;

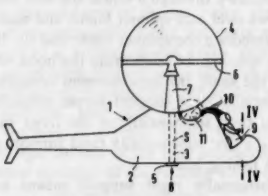
b. a second group of pieces formed with only said male connector on one side surface and the remaining side surfaces being continuously flat and free of functional discontinuities therein and of any means for interconnecting with other pieces; and

c. a third group of pieces formed with only the female connector recess on one side surface and the remaining side surfaces being continuously flat and free of functional discontinuities therein and of any means for interconnecting with other pieces.

4,090,323
MANNED TOY AIRCRAFT

Hans-Ulrich Wesenberg, Hammermuhlweg 6, D-8506 Langenzenn, Germany

Filed Nov. 22, 1976, Ser. No. 743,924
Claims priority, application Germany, Nov. 26, 1975, 2552976
Int. Cl.[2] A63H *33/20*
U.S. Cl. 46—74 R 8 Claims

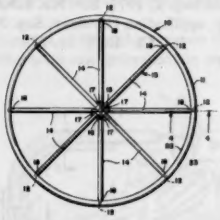


1. A manned toy aircraft, of which a helicopter and a free balloon are examples, comprising a body carrying an inflatable air balloon having a mouthpiece nozzle which is disposed with its longitudinal axis extending through the centre of gravity of the aircraft and has its aperture directed downwards towards the ground in the normal flight attitude of the aircraft, and of which the dimensioning is selected such that reaction force arising from air flowing out of the mouthpiece nozzle of the inflated air balloon is greater than the force of gravity which acts on the aircraft, characterised in that at least one model person is connected releasably to the aircraft and is equipped with an openable and foldable parachute and in that the body of the aircraft has a support which faces the air balloon and has a bearing surface which, with the inflated air balloon, defines a space for accommodating the folded-up parachute, that portion of the air balloon which faces the support serving as an automatically closing and opening closure for the said space for accommodating the parachute.

4,090,324
HOOP TOY ASSEMBLY

Sherman L. Compton, 4219 Berrybrook Dr., Richmond, Va. 23234

Filed Jun. 2, 1977, Ser. No. 802,849
Int. Cl.[2] A63H *33/02*
U.S. Cl. 46—220 3 Claims



1. A hoop toy assembly comprising:

a. A rigid hoop member fabricated from a tube bent into a circular shape and closed at both ends to form a continuous loop, said loop having an inside perimeter disposed toward the center of said loop and provided with a plurality of uniformly spaced depressions directed into said tube and integral therewith, the diameter of said inside perimeter being between 30 and 40 inches, the transverse section of said tube being uniform throughout the length thereof and having a maximum dimension between about 0.75 and 1.0 inch, said hoop having a weight between 5 and 13 ounces,

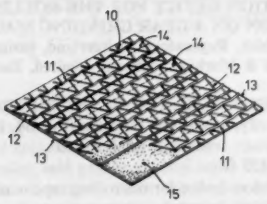
b. a multi-spoked member comprised of a plurality of elongated transparent cylindrical tube spokes of equal length attached at their proximal ends to a hub, the distal ends of said spokes defining a circular locus and each being provided with a stub adapted to fit snugly within said depressions, each spoke containing confined solid or liquid species capable of undergoing gravity-induced motion in response to rolling action of the hoop toy assembly, said multi-spoked member possessing sufficient flexibility so that it can be deformed when desired for engagement and disengagement with respect to said hoop, and

c. a pair of multi-lobed extensions mounted equidistantly on each side of said hub, and comprised of elongated hollow lobes containing solid or liquid species confined in a manner such that rolling motion of said hoop toy assembly will cause said confined species to travel from one lobe to another.

4,090,325
KNITTED FABRIC MULCHES

Aaron Mushin, 13 Pearson Grove, Caulfield, Victoria, Australia (3162), and Yaacov Saporta, 64 Finch St., East Malvern, Victoria, Australia (3144)

Filed Jul. 15, 1977, Ser. No. 816,158
Claims priority, application Australia, Jul. 21, 1976, 6720/76
Int. Cl.[2] A01G *7/00, 13/02;* B32B *3/16, 7/08*
U.S. Cl. 47—9 11 Claims



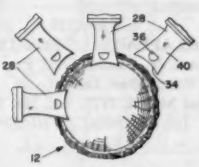
1. A method of mulching which comprises providing a mulch product in the form of an open-mesh fabric having knittedly inter-connected longitudinal and transverse yarn elements and a multiplicity of parallel strips of paper or other suitable material secured to a surface of the knitted fabric so as to form a laminated product wherein displacement between the strips and the knitted fabric in a direction parallel to the longitudinal elements of the knitted fabric is substantially prevented when the fabric is stretched in a direction at right angles to the longitudinal yarn elements and wherein one or both edge portions of the strips are free to move away from the fabric; and covering an area of ground with said product with said strips uppermost.

2. A mulch product comprising an open-mesh fabric having knittedly inter-connected longitudinal and transverse yarn elements and a multiplicity of parallel strips of paper or other suitable material secured to a surface of the knitted fabric so as to form a laminated product wherein displacement between the strips and the knitted fabric in a direction parallel to the longitudinal elements of the knitted fabric is substantially prevented when the fabric is stretched in a direction at right angles to the longitudinal yarn elements and wherein one or both edge portions of the strips are free to move away from the fabric.

4,090,326
APPARATUS FOR TREATING TREES

Paul Richard Crowson, Hattiesburg, Miss., and Herman Isaac Enos, Jr., Chadds Ford, Pa., assignors to Hercules Incorporated, Wilmington, Del.

Filed May 4, 1977, Ser. No. 793,696
Int. Cl.[2] A01G *23/10, 29/00*
U.S. Cl. 47—12 12 Claims



1. Apparatus for injecting liquid into a tree comprising:

a plurality of cutting elements having fluid passageways therethrough, wherein each said cutting element has a butt end and a first and second substantially planar surface extending from said butt end, forming a blade, said second surface of said cutting element having a portion thereof extending from said butt end in substantially parallel relationship with said first surface, and having an end portion thereof tapered toward said first surface to form a single bevel cutting edge, said cutting element having a cavity formed in said first surface near said cutting edge and having said fluid passageway therethrough in communication with said cavity;

means, in communication with each said passageway, for supplying liquid through said passageway to said cavity so that upon said cutting element striking a tree and forming a cut, liquid is discharged from said cavity into said cut;

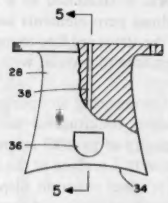
means for positioning said cutting elements around the periphery of a tree; and

means for driving certain of said cutting elements through the bark of said tree substantially simultaneously to expose the sapwood thereof and for ejecting a predetermined quantity of liquid through said passageways in said cutting element onto the sapwood.

4,090,327
APPARATUS FOR TREATING TREES

Paul Richard Crowson, Hattiesburg, Miss., assignor to Hercules Incorporated, Wilmington, Del.

Filed May 4, 1977, Ser. No. 793,698
Int. Cl.[2] A01G *23/10, 29/00*
U.S. Cl. 47—12 2 Claims

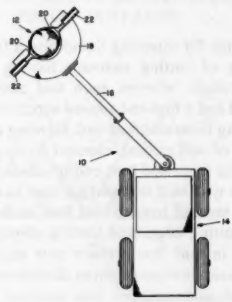


1. Apparatus for injecting liquid into a tree comprising:
a cutting element, said cutting element having a butt end and a first and a second surface extending from said butt end, said second surface of said cutting element having a portion thereof extending from said butt end in substantially parallel relationship with said first surface and having an end portion thereof tapered toward said first surface to form a blade with a single bevel cutting edge, said cutting element having a cavity formed in said first surface near said cutting edge and having a fluid passageway therethrough in communication with said cavity, said cutting edge is concave to substantially conform to the periphery of said tree; and
means for supplying liquid through said passageway to said cavity so that upon said cutting edge striking a tree and forming a cut, fluid is discharged from said cavity into said cut.

4,090,328
METHOD AND APPARATUS FOR TREATING TREES

Herman Isaac Enos, Jr., Chadds Ford, Pa., assignor to Hercules Incorporated, Wilmington, Del.

Filed May 4, 1977, Ser. No. 793,697
Int. Cl.[2] A01G *23/10, 29/00*
U.S. Cl. 47—12 16 Claims

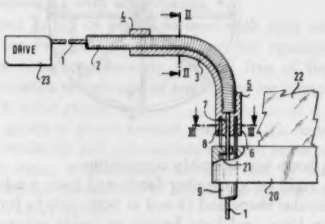


1. Apparatus for injecting liquid into a tree comprising:
a plurality of cutting elements having fluid passageways therethrough;
means, in communication with said passageways, for supplying a liquid;
means for positioning said cutting elements around the periphery of a tree;
means for driving certain of said cutting elements through the bark of the tree substantially simultaneously to expose the sapwood thereof and for ejecting a predetermined quantity of liquid through said passageways in said cutting element onto the sapwood.

4,090,329
WINDOW OPERATING MECHANISM

Hans Rampel, Eicha, Germany, assignor to Metallwerk Max Brose GmbH & Co., Coburg, Germany

Filed Sep. 1, 1977, Ser. No. 829,622
Claims priority, application Germany, Sep. 30, 1976, 2644213
Int. Cl.[2] E05F *11/48*
U.S. Cl. 49—352 10 Claims



1. A window operating mechanism comprising:
(a) an elongated tubular guide member defining a longitudinal bore therein and formed with a longitudinal slot communicating with said bore;
(b) a support assembly slidably guided on said guide member, a portion of said assembly being received in said slot, said assembly including means for supporting the window to be operated;
(c) an elongated tension member partly received in said bore and fastened to said portion of said support assembly, a part of said tension member projecting longitudinally from said bore;
(d) deflector means for deflecting said projecting part into an arcuate path,
(1) said deflector means including an elongated channel portion extending in an arc and formed with a longitudinal groove, and two longitudinally terminal, annular portions connected by said channel portion,
(2) said terminal portions each extending in a closed loop about an opening communicating with said groove,
(3) one of said terminal portions being formed with a recess extending about the opening thereof and receiving one longitudinal end of said guide member;
(e) a tubular sheath having respective portions received in said groove and in the openings of said terminal portions,
(1) said tension member extending from said portion of said support assembly through said sheath beyond the other terminal portion of said deflector means; and
(f) drive means for longitudinally moving said tension member and for thereby moving said support assembly.

4,090,330
CORRECTION DEVICE FOR THE ROLLING TYPE TENSION ON A GEAR GRINDING MACHINE

Eduard Mischler, Regensdorf, Switzerland, assignor to Maag Gear-Wheel & Machine Company Limited, Zurich, Switzerland

Filed Jul. 15, 1977, Ser. No. 816,270
Claims priority, application Germany, Jul. 30, 1976, 2634305
Int. Cl.[2] B24B *19/00*
U.S. Cl. 51—123 G 4 Claims

1. A correction device for the rolling tape tension on a gear grinding machine, especially a form grinding machine for spur and helical cylindrical gears, comprising:
tapes subjected to an initial basic tension at rest;

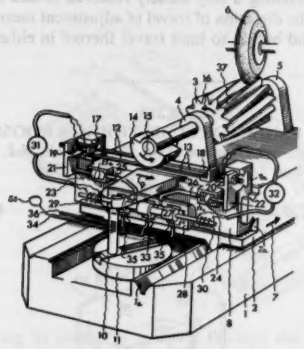
a rolling block to which one end of each of the tapes is attached;

said rolling block and said tapes coacting with one another such that a relative rolling action occurs therebetween;

a tape stand mounted to be movable to-and-fro at which the other end of each of the tapes is attached;

said mounting means including intermediate pieces defining tape clamps at which the other end of said tapes are attached, said intermediate pieces being carried by said tape stand;

means for imposing an additional torque on the rolling block and cooperating with said intermediate pieces;



gauging means for measuring the tension in the rolling tapes and for comparing the same with the initial basic tension at rest;

said gauging means, in the event of a decrease in the tension of the tapes relative to the initial tension on one side of the rolling block actuating said torque imposing means to produce an additional torque on the opposite side of said rolling block until the measured tension on the one side of the rolling block again attains the level of the initial tension.

4,090,331

APPARATUS FOR PREVENTING CIRCUMFERENTIAL OVERSPEEDING OF A GRINDING WHEEL

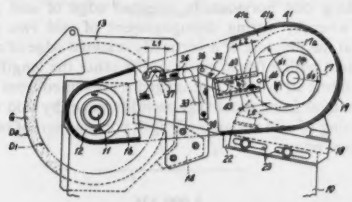
Akiyoshi Kobayashi, and Yukihiro Nakayama, both of Kariya, Japan, assignors to Toyoda-Koki Kabushiki-Kaisha, Japan

Filed May 17, 1977, Ser. No. 797,616

Claims priority, application Japan, Jun. 23, 1976, 51-74103

Int. Cl.[2] B24B *47/18*

U.S. Cl. 51—134.5 R **8 Claims**



1. In an apparatus for preventing circumferential overspeeding of a grinding wheel in a grinding machine having a wheel head, a wheel spindle rotatably supported upon said wheel head for mounting said grinding wheel and a driven pulley at both ends thereof, a drive motor adapted to have first and second drive pulleys alternatively mounted thereon, said second drive pulley having a diameter larger than that of said first drive pulley, and belt means for drivingly connecting said drive pulley on said drive motor with said driven pulley, the improvement comprising:

means for providing slot means extended radially of said grinding wheel and defining thereon retraction and forward positions corresponding, respectively, to first and second diameters of said grinding wheel;

a cover device for accommodating said drive pulley on said drive motor, said driven pulley and said belt means;

a slide plate guided by said cover device and slidable radially of said drive pulley on said drive motor;

a first member perforated through said slot means to be opposed to the circumferential surface of said grinding wheel;

a second member engaged with said slide plate to be moved radially of said drive pulley on said drive motor together with said slide plate;

a link mechanism provided upon said wheel head for linking said first member with said second member; and

a restraining member provided upon said slide plate to be moved by said link mechanism into such a space as to be occupied by said second drive pulley on said drive motor when said first member is retracted from said forward position to said retract position within said slot means.

4,090,332

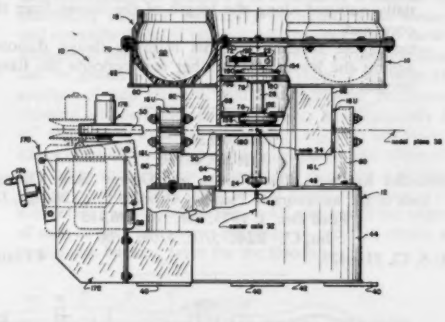
SUSPENSION SYSTEM FOR BOWL-TYPE VIBRATORY FINISHING MACHINE

John F. Rampe, Mayfield Heights, Ohio, assignor to Rampe Research, Cleveland, Ohio

Continuation-in-part of Ser. No. 714,823, Aug. 16, 1976. This application Sep. 3, 1976, Ser. No. 720,212

Int. Cl.[2] B24B *31/06*

U.S. Cl. 51—163.2 **22 Claims**



1. A bowl-type vibratory finishing machine, comprising:

a. a base structure;

b. a bowl structure having a central axis and defining a substantially annular chamber adapted to receive finishing media and workpieces to be finished;

c. a plurality of elastomeric mounts movably supporting the bowl structure on the base structure, each of the mounts having one portion secured to the bowl structure and another portion secured to the base structure, the one and another portions defining an axis for each mount;

d. drive means for vibrating the bowl structure relative to the base structure to impart a finishing action to contents of the chamber with the bowl structure moving substantially about a nodal point on the central axis;

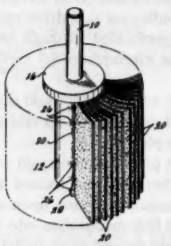
e. the elastomeric mounts including a first group of mounts arranged such that their axes intersect at the central axis at a first location on one side of the nodal point, and a second group of mounts arranged such that their axes intersect the central axis at a second location on the other side of the nodal point.

4,090,333

FLEXIBLE GRINDING WHEEL

Aleck Block, Los Angeles, and Hiroshi Hasegawa, Whittier, both of Calif., assignors to Merit Abrasive Products, Inc., Compton, Calif.

Filed Mar. 25, 1977, Ser. No. 781,121
Int. Cl.[2] B24D *13/04*
U.S. Cl. 51—336 11 Claims



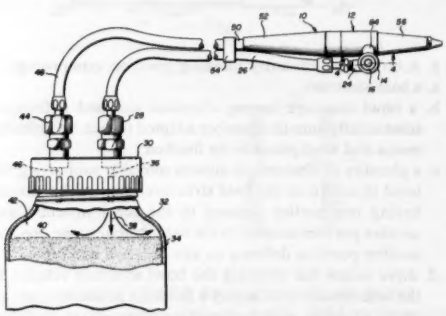
1. A flexible grinding wheel, including,
a core member having a central opening and a flange portion at one end,
a shaft member disposed within the central opening and extending from the core member for supporting the core member for rotation,
a plurality of leaves of abrasive material extending radially outward and disposed circumferentially around the core member and with the plurality of leaves at one end disposed against the flange, and
bonding material disposed to bond the leaves to the core member including the flange portion and with the bonding material disposed between the leaves and extending partially outward along the length of the leaves from the core, and
wherein the bonding material forms a flange disposed against the leaves at the other end opposite the flange portion of the core member.

4,090,334

AIR ERASER

Benedict Kurowski, Des Plaines, and George Sack, Chicago, both of Ill., assignors to Paasche Airbrush Co., Chicago, Ill.

Filed Dec. 1, 1975, Ser. No. 636,415
Int. Cl.[2] B24C *5/02, 5/04, 7/00*
U.S. Cl. 51—427 4 Claims



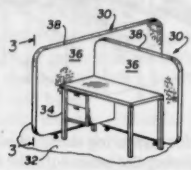
1. An air eraser comprising an elongated body having an outlet nozzle at one end thereof, an inlet at the opposite end of said body and a straight through flow passage extending longitudinally through said body and connecting said inlet and said outlet nozzle free of any intervening obstruction, an air valve mounted on said body and spaced laterally of said flow passage, said valve having manually operable means for opening and closing said valve, means providing an air inlet to said valve and adapted for connection to a source of air under pressure, means providing an air outlet from said valve for passing air under pressure out from said valve when said valve is open, a remote container for abrasive particulate material, flexible conduit means connecting said valve outlet to said container, and flexible conduit means connecting said container to said body inlet substantially in line with said flow passage to carry air under pressure with entrained abrasive particulate material from said container to said body and out through said outlet nozzle, said valve having a spring biased button engageable by a finger, and having a lateral kerf therein and further including a stop loosely received in said kerf and adjustable in the direction of travel of adjustment means cooperable with said button to limit travel thereof in either direction.

4,090,335

PARTITION PANEL FOR SUBDIVIDING A ROOM AREA

Frank Curatolo, 130 Overlook Ave., Hackensack, N.J. 08602

Filed Sep. 14, 1977, Ser. No. 833,303
Int. Cl.[2] E04B *1/38*
U.S. Cl. 52—239 4 Claims



1. An improved partition panel for combination with similarly constructed partition panels in subdividing the area of a room, said improved partition panel comprising an internal plastic body having plural openings therein for reducing the weight thereof, a rectangular frame having a rectangular opening therein sized to receive therein said plastic body to form a composite body structure, a pair of flat sheets applied as facing on opposite sides of said composite body structure to complete the construction of said partition panel, a pair of fabric covers, each of a looped fibrous construction, adhesively secured in covering relation on opposite sides of said partition panel, and a fabric strip, of an extending hook-like fibrous construction adapted to engage with said looped fibrous construction of said fabric covers, adhesively secured about the periphery of said partition panel for achieving said engagement of said panel incident to the contact of said fabric strip thereof to said fabric cover of a cooperating panel, said fabric strip being of a lengthwise size to extend along both vertically oriented edges and at least along one horizontally oriented edge of said partition panel, whereby during disengagement of said two partition panels at the juncture of a vertically oriented edge of one from its contact with a fabric cover of the other the length portion of said fabric strip being disengaged is prevented from inadvertent removal from about said partition panel by said wrapped positioning of said remaining length portion thereof relative to said panel edges.

4,090,336

INSULATED ROOFING STRUCTURE

Frank E. Carroll, Barrington, Ill., assignor to Carroll Research, Inc., Rolling Meadows, Ill.

Continuation-in-part of Ser. No. 410,874, Oct. 29, 1973, abandoned. This application Apr. 14, 1975, Ser. No. 567,621
Int. Cl.[2] E04C *1/00*
U.S. Cl. 52—309.7 9 Claims

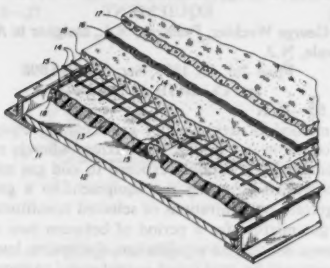
1. A poured insulated deck structure comprising:
deck support members;

moisture permeable gypsum formboard having an underside adjacent said deck support members;

strips of rigid synthetic polymer foam having an underside adjacent the upperside of said gypsum formboard and having openings between said strips providing communication from above said foam to said formboard, said openings having an area of about 5 to 20 percent of the area of said formboard;

reinforcing wire mesh over said foam;

poured concrete adjacent the upperside of said foam and extending through said openings into contact with and adhering to about 5 to 20 percent of the area of the upperside of said gypsum formboard, said concrete continuing



drying by escape of moisture through the formboard in the area of contact between the concrete and formboard, said concrete surrounding the portion of the deck support members above said formboard resulting in a reinforced concrete beam structure including the deck support members;

additional concrete beam structures formed by concrete extending through openings between said strips of foam about midway between said deck support members, said additional beam structures adhering to said formboard preventing sagging; and

a waterproof wearing surface to the exterior of the poured concrete.

4,090,337

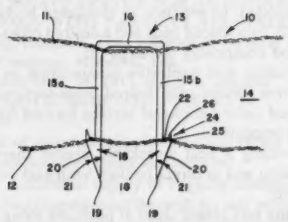
FLEXIBLE FORM FOR CEMENTITIOUS SLURRY

John M. Szekeres, Parma, Ohio, assignor to Medina Plastic Products, Inc., Medina, Ohio

Filed Aug. 10, 1977, Ser. No. 823,290

Int. Cl.[2] E02B *3/12;* E04B *1/345*

U.S. Cl. 52—309.1 **7 Claims**



1. A form for shaping concrete slabs comprising: first and second sheets of fabric material loosely woven from cord-like filaments; a plurality of individual connectors cooperatively interengaging said first and second sheets to permit separation of said sheets a substantial but limited amount; each said connector having at least one shaft with opposite first and second ends; a point at said first end of said shaft to pierce said first and second sheets; a crown at said second end of said shaft to engage said first sheet and limit the extent to which said shaft can penetrate said first sheet; a barb in proximity to said first end of said shaft, said barb presenting a re-entrant tip spaced laterally of said shaft and disposed in a direction opposite the point on said shaft to pierce said second sheet; and a bridge spanning between said shaft and said barb to engage said second sheet and limit the extent to which said barb can retro-penetrate said second sheet.

4,090,338

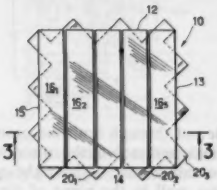
PARQUET FLOOR ELEMENTS AND PARQUET FLOOR COMPOSED OF SUCH ELEMENTS

Pierre Bourgade, Melun, France, assignor to B 3 L, Creteil, France

Filed Dec. 13, 1976, Ser. No. 749,969

Int. Cl.[2] E04F *13/08;* E04C *1/30*

U.S. Cl. 52—392 **4 Claims**



1. A parquet floor element comprising:

a planar upper facing layer with four edges forming a right angled parallelepipedic periphery,

a firm backing lower layer with a non-rectilinear periphery,

means fixing the facing layer to the backing layer, such that said non-rectilinear periphery is formed by a number of alternating identical outwardly projecting teeth means and inwardly directed recesses with respect to said parallelepipedic periphery, whereby any edge of said element can be joined with any edge or portion of an edge of another of said element, said non-rectilinear periphery crossing said parallelepipedic periphery at substantially a 45° angle so as to allow a joining of any two successive edges of an element with the free perpendicular edges of two other such elements already laid down by a sliding motion parallel to the plane of said planar facing layer in a direction making substantially a 45° angle with the edges of said already laid down elements, in order to obtain a continuous backing layer for the flooring.

4,090,339

PREFORMED STRUCTURAL PANEL MEMBER

Ernest L. Anderson, 4606 148th Ave. NE., Bellevue, Wash. 98009

Continuation-in-part of Ser. No. 192,601, Oct. 26, 1971, abandoned, which is a continuation of Ser. No. 823,590, May 12, 1969, abandoned. This application Feb. 12, 1976, Ser. No. 657,473

Int. Cl.[2] E04C *2/38*

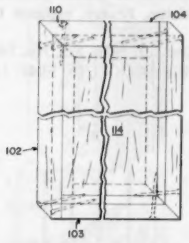
U.S. Cl. 52—580 **4 Claims**

1. A structural panel assembly comprising:

two parallel face sheets;

a rigid rectangular border frame surrounding said sheets and having top and bottom rails interconnected by side rails, all of said rails having the same transverse cross-section but with said side rails turned end-for-end relative to one another and with said top and bottom rails also turned end-for-end relative to one another so that the top rail and a first of the side rails have one cross-sectional orientation and the bottom rail and the second side rail have the opposite cross-sectional orientation, said cross-section being so shaped that like border frames juxtaposed side against side will interfit at the sides by sliding engagement

along a plane parallel to the longitudinal planes of said face sheets, each said rail having an outwardly extending protrusion and a groove lying along said protrusion, said protrusion having a head wall and a pair of inner and outer outwardly converging sidewalls, said groove having a base wall and a pair of inner and outer outwardly diverging sidewalls, each rail having a bevel cut at the one end face where the cross-sectional orientation is the same as that of the adjoining rail to form a respective bevel joint, the other end face of two of said rails being formed by a



right angle cut through both the groove and protrusion cross-sections, and each of the other two of the rails having its other end formed with a right angle cut through its groove base wall in the plane of the head wall of the adjoining rail for overlapping the right angle cut end of the protrusion of such adjoining rail and having its protrusion cut back lengthwise to the plane of the base wall of the groove of such adjoining rail by a cutback matching the cross-section of such groove; and

means for securing the face sheets to the border frame.

4,090,340

LOAD BEARING STRUCTURAL ELEMENT

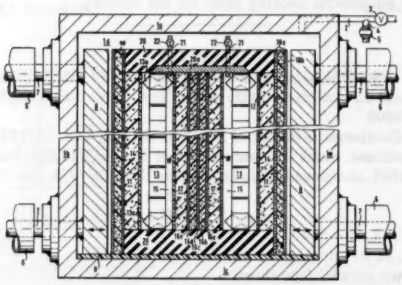
Otto Alfred Becker, Robert Koch Strasse 59, 66 Saarbruecken 6, Germany

Continuation-in-part of Ser. No. 502,094, Aug. 30, 1974, abandoned. This application Dec. 16, 1974, Ser. No. 533,453

Claims priority, application Germany, Aug. 30, 1973, 2343792; Dec. 15, 1973, 2362497

Int. Cl.[2] E04B *1/74*

U.S. Cl. 52—618 **11 Claims**



1. A load-bearing structural assembly comprising

(a) outer composite shell assemblies forming the sides of said assembly, said shell assemblies being spaced and defining a cavity therebetween,

(b) an intermediate load-bearing composite group disposed in said cavity between and spaced from said outer shell assemblies, and

(c) cellular web assemblies disposed respectively between said intermediate composite group and outer shell assemblies, said web assemblies being formed with inserts at either side thereof which serve to initially space said outer composite shell assemblies from said intermediate load-bearing composite group so as to permit evacuation or pressurization during the formation of the structural assembly, said inserts being compressed during such formation, said web assemblies having lateral edges which are tightly and compressively engaged by said intermediate composite group and said shell assemblies thereby to seal off the individual cells in said web assemblies, whereby the desired pressure conditions can be maintained in said web assemblies.

4,090,341

TREATMENT AND PACKAGING OF GAS HANDLING EQUIPMENT

Stephen George Wechter, Palmyra, N.J., assignor to Airco, Inc., Montvale, N.J.

Filed Jul. 11, 1977, Ser. No. 814,598

Int. Cl.[2] B65B *31/00, 55/00*

U.S. Cl. 53—21 R **9 Claims**

1. A method of treatment of gas handling equipment intended for use with a specific gas mixture wherein said equipment includes metal surfaces exposed to said gas mixture and which comprises exposing the equipment to a gas mixture having greater concentrations of selected constituents of said specific gas mixture for a period of between two and forty-eight hours, so that an equilibrium absorption level of said constituents will be established in said metal surfaces exposed to said gas mixture, and packaging the equipment in an atmosphere of a gas which will not disturb said absorption level.

4,090,342

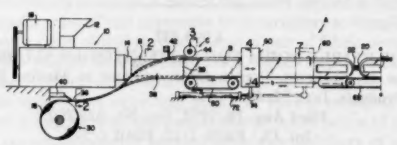
METHOD OF PACKAGING AN EXTRUDABLE EXPLOSIVE COMPOSITION

James P. Rishel, McArthur, Ohio, assignor to Austin Powder Company, Beachwood, Ohio

Continuation of Ser. No. 632,086, Nov. 14, 1975, abandoned. This application Mar. 8, 1977, Ser. No. 775,616

Int. Cl.[2] B65B *53/02, 9/06, 11/16*

U.S. Cl. 53—23 **6 Claims**



1. A method of packaging an extrudable explosive composition having a processing temperature which generally should not be exceeded, to produce an elongated body having a desired length, two spaced ends and a desired cross-sectional size, said method comprising the steps of:

(a) extruding said explosive composition in an elongated extrusion having said desired cross-sectional size and an exposed outer peripheral surface formed from said explosive composition;

(b) providing a heat shrinkable plastic sheet around said extrusion and in direct contact with said outer peripheral surface;

(c) closing said plastic sheet at positions along said extrusion corresponding to said desired length;

(d) severing said plastic sheets at said positions to produce separate bodies of wrapped, extruded explosive compositions; and,

(e) passing said bodies through a heating zone at a selected temperature above said processing temperature and at a rate to heat said plastic sheet to a shrink temperature substantially higher than said processing temperature while said bodies of explosive composition are heated to a temperature below said processing temperature whereby

said plastic sheet shrinks into tight contact with said outer peripheral surfaces of said bodies while said cross-sectional size is retained.

4,090,343

PACKAGE INTENDED FOR PRESSURIZED CONTENTS

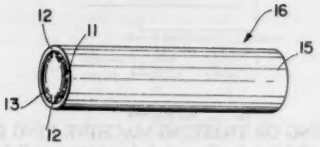
Gad Anders Rausing, Lund, Sweden, assignor to Tetra Pak Developpement SA, Lausanne, Switzerland

Filed May 12, 1976, Ser. No. 685,773

Claims priority, application Switzerland, Oct. 17, 1972, 15144/72

Int. Cl.[2] B65B *41/18*

U.S. Cl. 53—27 **3 Claims**



1. Process of forming a package of a fluid containing a gas dissolved therein, which comprises

forming a web of gas-impermeable plastics material into a tube;

introducing into said tube a filling of a refrigerated fluid containing a gas dissolved therein

sealing the tube at spaced intervals to form a series of connected sealed filled containers connected by sealing zones between adjacent containers;

severing each filled container, promptly as formed, from the series by cutting through each sealing zone whereby each so-severed filled container is characterized by two sealed seams along opposite sides of a generally cylindrical container having seamless ends; and

promptly enclosing each said severed filled container within a stiff open-ended shell with the seams parallel to the longitudinal axis of the shell and in contact with, and fully shielded by, said shell, any part of the container accessible at an open end of the shell being seamless.

4,090,344

METHOD AND APPARATUS FOR AUTOMATICALLY FILLING BAGS WITH PARTICULATE MATERIALS

Robert C. Kelly, Houston, Tex., assignor to General Packaging Equipment Company, Houston, Tex.

Filed Mar. 23, 1977, Ser. No. 780,283

Int. Cl.[2] B65B *9/12, 57/10, 37/18*

U.S. Cl. 53—28 **21 Claims**

1. A method of automatically forming and filling bags with particulate materials comprising the steps of:

providing a continuous supply of bagging material;

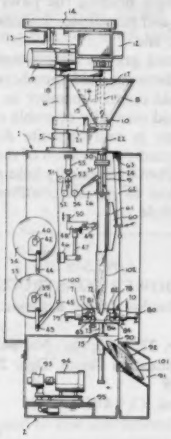
feeding said bagging material through former means to form a tube of bagging material suspended from said former means;

sealing the sides and bottom of a portion of said bagging material to form a top opened bag in communication with a source of particulate materials;

dispensing particulate materials into said bag to near a predetermined net weight;

weighing said bag and particulate materials by suspending said former means and said bag from weigh means as said dispensing continues;

terminating said dispensing in response to reaching said predetermined net weight; and



sealing the top of said bag and separating said bag from said continuous supply of bagging material.

4,090,345

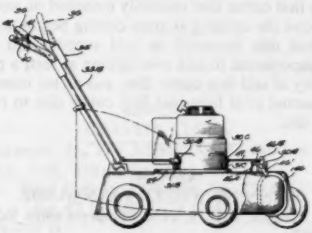
BRAKE SAFETY SYSTEM FOR A POWER DRIVEN ROTARY MOWER

Joseph R. Harkness, Germantown, Wis., assignor to Briggs & Stratton Corporation, Wauwatosa, Wis.

Division of Ser. No. 667,696, Mar. 17, 1976, Pat. No. 4,037,389. This application Nov. 15, 1976, Ser. No. 741,732

Int. Cl.[2] A01D *69/10*

U.S. Cl. 56—10.5 **6 Claims**



1. In combination with a rotary mower having a housing with a support deck, and a handle member for manually guiding directional movement of said mower:

A. a power driven rotary shaft projecting downwardly through said deck and having an end portion below the deck;

B. a blade and first disc affixed to said end portion of the shaft;

C. a rotary brake disc journalled on said end portion of the shaft and having spaced apart tooth means radially spaced from the axis of said rotary brake disc;

D. means providing a spring loaded frictional driving connection between said discs;

E. a pawl constrained to pivotal movement about an axis fixed with respect to said rotary shaft and yieldingly biased toward engagement with said tooth means;

F. a manually operable control member movably associated with the handle member of the mower and operatively connected with said pawl so as to be yieldingly urged in one direction by the biasing force acting on the pawl, to a

first position relative to the handle member in which position the pawl is engaged with said tooth means and from which position it is movable in the opposite direction to a second position holding the pawl disengaged from said tooth means and permitting power driven rotation of the mower blade; and

G. manually activated gravity deactivated latch means arranged to react between said members and upon being activated hold said control member in said second position, as long as said manually operable control member is not moved farther in said opposite direction, whereby upon gravity effected deactivation of the latch means said control member must be manually held against movement to its first position to permit continued power driven rotation of said blade.

4,090,346

LAWN MOWER CONSTRUCTION

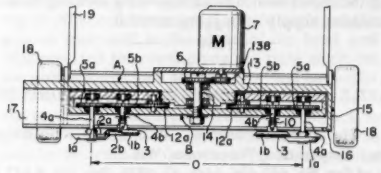
Hachiro Doi, Kamifukuoka, Japan, assignor to Fuso Keigokin Co., Ltd., Japan

Filed Dec. 23, 1975, Ser. No. 643,756

Claims priority, application Japan, Dec. 28, 1974, 50/3268; Dec. 28, 1974, 50/3269

Int. Cl.[2] A01D *55/26*

U.S. Cl. 56—13.6 **13 Claims**



1. A lawn mower for cutting grass, comprising a frame having an open bottom and a lateral discharge opening, a support member mounted on said frame over the open bottom, at least one first cutter disc rotatably mounted on said support member above the opening at grass cutting height, at least one second cutter disc mounted on said support and having a periphery superjacent to and overlapping at least a portion of the periphery of said first cutter disc, and motor means on said frame connected to at least said first cutter disc to rotate said first cutter disc.

4,090,347

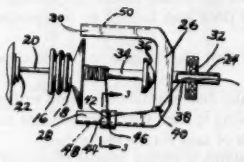
SPINNING WHEEL YARN GUIDE

Doloria M. Chapin, R.D. 1, 2178 Pompey-Fabius Rd., Fabius, N.Y. 13063

Filed Jun. 24, 1977, Ser. No. 809,916

Int. Cl.[2] D01H *1/04, 7/24, 7/48*

U.S. Cl. 57—71 **5 Claims**



1. In a spinning wheel for making yarn from wool or flax, apparatus for guiding the spun yarn as it is wound in a coil, said apparatus comprising:

(a) a bobbin mounted for rotation about an axis;

(b) a flyer, mounted for rotation about said axis and having a pair of arms extending substantially parallel to said axis for substantially the entire axial length of said bobbin and spaced radially outward thereof;

(c) means for imparting rotation to said bobbin and said flyer;

(d) a collar at least partially encircling one of said flyer arms for sliding movement along the length of said one arm;

(e) a yarn guide fixedly attached to said collar; and

(f) a permanent magnet fixedly mounted upon one and a magnetically permeable material upon the other of said collar and said one arm, said magnet and material being relatively arranged for mutual attraction sufficient to yieldably fix the position of said collar along the length of said one arm.

4,090,348

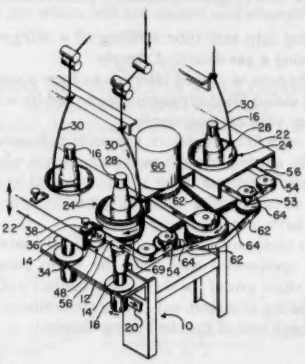
SPINNING OR TWISTING MACHINE RING DRIVE

Joseph M. DeVittorio, Carmel, Ind., assignor to Spintex, Inc., Indianapolis, Ind.

Filed Jul. 19, 1976, Ser. No. 706,569

Int. Cl.[2] D01H *1/241, 7/58*

U.S. Cl. 57—105 **6 Claims**

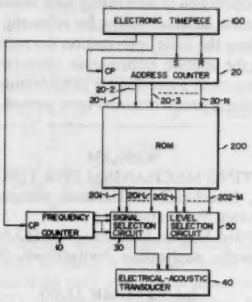


1. In a spinning or twisting machine having a spindle carrying a bobbin, means for rotating said spindle, a ring rail, a ring positioned about said bobbin, means mounting said ring to said rail for rotation relative to said bobbin, traveler means carried by said ring for guiding filament material onto said bobbin, the improvement comprising a wheel located adjacently spaced from said ring, a shaft having a pivot axis journaled in said ring rail, said shaft having an offset end portion spaced from said ring rail, said wheel journaled to said shaft offset end portion so as to be laterally shiftable upon rotation of said shaft about its pivot axis, an arm secured at one end to said shaft at a location spaced from said offset end portion, said arm being rotatable about the pivot axis of said shaft to laterally shift said wheel between a first position next to said ring and a second position further spaced from the said ring, lock means cooperable with said rail and carried by said arm spaced from said shaft pivot axis for selectively securing said wheel in either its first or second position, an endless belt having a run passing between said wheel and ring, means for rotating said belt, said belt run being compressed between said wheel and rim in driving contact with the ring to cause rotation of the ring when said wheel is in its first position, said belt run being spaced from said ring when said wheel is in its second position.

4,090,349
ELECTRONIC MUSIC BOX CIRCUIT

Tsuneo Takase, Yokohama, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Tokyo, Japan

Filed Apr. 6, 1977, Ser. No. 785,090
Claims priority, application Japan, Apr. 8, 1976, 51-39586
Int. Cl.[2] G04B *21/08*
U.S. Cl. 58—12 12 Claims



1. An electronic timepiece circuit comprising:

timepiece means including a signal generating circuit for generating a plurality of signals with different frequencies and a time counting circuit for counting at least one output signal from said signal generating circuit to measure time;

an address designation circuit connected to one of the output terminals of said signal generating circuit to produce an address designation signal;

a semiconductor memory circuit including a plurality of address lines selectively energized by said address designation signal, a plurality of first output lines and a plurality of second output lines in which, when one of the address lines is energized, an output signal is delivered through at least one of the first output lines selected by said energized address line and one of the second output lines selected by said energized address line;

a signal selection circuit including a scale signal selection circuit and a signal level selection circuit, said scale signal selection circuit being comprised of a plurality of AND gates whose first input terminals are respectively connected to the first output lines of said memory circuit and whose second input terminals are respectively connected to the output terminals of said signal generating circuit, and an OR gate connected to the output terminals of said AND gates, and said signal level selection circuit being comprised of a plurality of first transistors whose bases are connected to the respective output lines of said memory circuit; and

electrical-to-acoustic transducing means connected to the output terminal of said OR gate and to the collectors of said first transistors to produce a sound signal whose frequency and amplitude are determined by the output signals from said OR gate and said first transistors.

4,090,350
ELECTRONIC TIMEPIECE

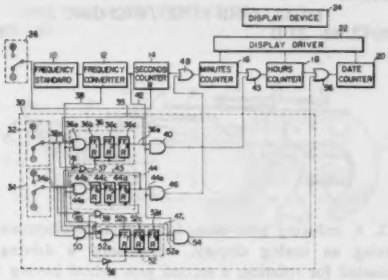
Yasushi Nomura, Tokorozawa, Japan, assignor to Citizen Watch Co., Limited, Tokyo, Japan

Filed May 3, 1976, Ser. No. 682,667
Claims priority, application Japan, May 6, 1975, 50/53999; Feb. 16, 1976, 51/16977
Int. Cl.[2] G04B *27/08;* G04C *3/00*
U.S. Cl. 58—23 R 17 Claims

1. In an electronic timepiece having a plurality of control switches, the improvement comprising:

first means coupled to a first of said control switches for generating an output corresponding to a first switching function when said first of said control switches is actuated;

second means coupled to a second one of said control switches for generating an output corresponding to a second switching function when said second of said control switches is actuated;



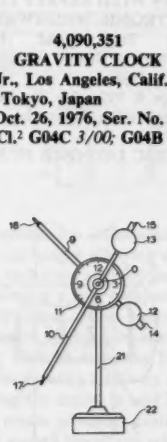
third means coupled to first and second control switches for generating an output corresponding to a third switching function when said first and second control switches are concurrently actuated; and

said first and second means coupled to said third means whereby said first and second switching functions are inhibited when said third means generates the output corresponding to said third switching means.

4,090,351
GRAVITY CLOCK

Jay M. Foreman, Jr., Los Angeles, Calif., assignor to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Oct. 26, 1976, Ser. No. 735,506
Int. Cl.[2] G04C *3/00;* G04B *15/00*
U.S. Cl. 58—23 D 12 Claims



1. A timepiece comprising:

at least one rotatably supported revolving member for indicating the time;

a means fixed distantly from the point of rotatable support on said rotatably supported revolving member for causing the center of gravity of said revolving member to revolve whereby said revolving member is caused to revolve.

4,090,352

REDUCING GEAR-TRAIN OF AN ELECTRONIC WATCH WITH ANALOG DISPLAY

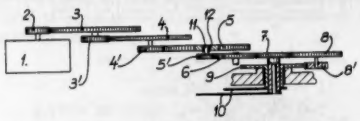
Pierre M. Jeannet, Chambrelien, and Michel Girardin, La Chaux-de-Fonds, both of Switzerland, assignors to Devhorl S.A., Switzerland

Filed Aug. 19, 1976, Ser. No. 715,829

Claims priority, application Switzerland, Aug. 20, 1975, 11310/75

Int. Cl.² G04B *13/02, 19/02;* **G04C** *3/00*

U.S. Cl. 58—23 D **4 Claims**



1. A reducing gear-train, for use in an electronic watch having an analog display, comprising: a driving pinion mounted for rotation; a second gear wheel having a pinion concentric therewith and mounted to rotate therewith, wherein said second wheel is positioned to engage with and is driven by said driving pinion; a third gear wheel having a pinion concentric therewith and mounted to rotate therewith, wherein said third wheel is positioned to engage with and is driven by said second wheel pinion; a great gear wheel having a pinion concentric therewith and mounted to rotate therewith, wherein said great wheel is positioned to engage with and is driven by said third wheel pinion; an intermediate gear wheel positioned to engage and be driven by said great wheel pinion; and a cannon pinion positioned eccentrically of an axis of rotation of said great wheel and positioned to engage and be driven by said intermediate wheel, wherein said intermediate wheel is dimensioned to define a ratio of rotational speed between said great wheel and said cannon pinion greater than one.

4,090,353

TOUCH SWITCH CONTROLLED TIME INFORMATION CORRECTION WITH SAFETY LOCK IN AN ELECTRONIC WRISTWATCH

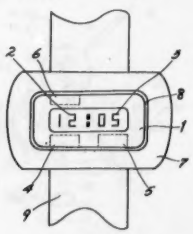
Hidetoshi Maeda, Tenri, and Takehiko Sasaki, Yamatokoriyama, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jan. 9, 1976, Ser. No. 647,891

Claims priority, application Japan, Jan. 10, 1975, 50-5838; Jan. 18, 1975, 50-8172

Int. Cl.² G04C *3/00;* **G04B** *19/30, 27/00*

U.S. Cl. 58—85.5 **7 Claims**



1. In an electronic wristwatch which comprises a casing including a front glass window, a time information calculation circuit, an hour information display unit covered by the front glass window and a minute information display unit covered by the front glass window, the improvement comprising:

a. an hour information correction touch electrode for correcting the hour information displayed on the hour information display unit;

b. a minute information correction touch electrode for correcting the minute information displayed on the minute information display unit;

c. safety lock means for inhibiting the hour information correction operation and the minute information correction operation when it is not desired; and

d. release means for releasing said safety lock means to preclude operation of said safety lock means, wherein said release means includes means for releasing the safety lock means when the hour information correction touch electrode or the minute information correction touch electrode is touched more than a predetermined mumber of times within a predetermined time period.

4,090,354

COUNTING MECHANISM FOR TIMEPIECE

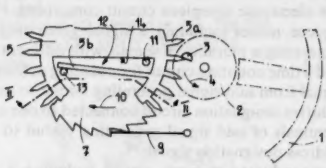
Ali Schneiter, Neuchatel, Switzerland, assignor to Ebauches S.A., Neuchatel, Switzerland

Filed May 6, 1976, Ser. No. 683,646

Claims priority, application Switzerland, Mar. 24, 1976, 006178/76

Int. Cl.² G04B *15/00*

U.S. Cl. 58—117 **8 Claims**



1. A counting mechanism for a timepiece comprising

a counting wheel pivotally mounted for oscillation,

drive means for oscillating said counting wheel in one direction and then in the other, said drive means being adapted and arranged to release said counting wheel between each oscillating cycle,

a ratchet wheel rotatably mounted co-axially of said counting wheel for step-by-step rotation in said one direction,

a retaining pawl for preventing rotation of said ratchet wheel in said other direction, and

coupling means including a resilient coupler for interconnecting said counting wheel and said ratchet wheel in a predetermined angular relationship to each other such that during each such oscillating cycle said drive means drives said counting and ratchet wheels in unison in said one direction and then drives said counting wheel in said other direction against said resilient coupler out of said predetermined angular relationship with said ratchet wheel, said counting wheel being returned to such relationship with said ratchet wheel by said resilient coupler upon release of said counting wheel by said drive means.

4,090,355

ELECTRONIC METRONOME

Fumio Morohoshi, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Sep. 17, 1976, Ser. No. 724,315

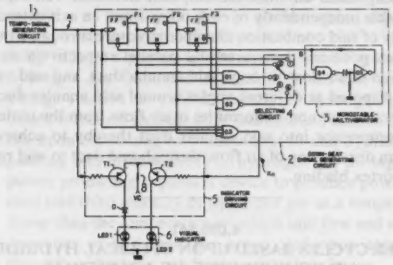
Claims priority, application Japan, Sep. 17, 1975, 50-127775[U]

Int. Cl.² G04F *5/02;* **G10B** *15/00*

U.S. Cl. 58—130 E **3 Claims**

1. An electronic metronome comprising a tempo signal generating means having an output, a down-beat signal generating means connected with said output of said tempo signal generating means, said down-beat signal generating means receiving a tempo signal from said tempo signal generating

means and generating a down-beat signal therefrom, an indicator driving circuit connected to said tempo signal generating means and to said down-beat signal generating means and receiving signals therefrom, said indicator driving circuit having first and second outputs, a first LED and a second LED connected respectively to said first and second outputs of said



indicator driving circuit, said indicator driving circuit energizing said first LED to make it conduct when said indicator driving circuit receives only said tempo signal and energizing said second LED to make it conduct when said indicator driving circuit receives both said tempo signal and said down-beat signal, said first LED being different from said second LED in colour and being packaged close to said second LED.

4,090,356

GRAVITY READING PACER

Patrick Raymond Arnold, 6668 Donecote Dr., Columbia, Md. 21044

Filed Mar. 5, 1976, Ser. No. 664,146
Int. Cl.² G04F *1/08*
U.S. Cl. 58—144 **10 Claims**

1. A reading pacer comprising

a. an elongated hollow tube, said tube being at least in part transparent along a portion of its length,

b. a pair of closed portions longitudinally-spaced from each other in said tube,

c. a viscous fluid substantially completely filling the volume of said tube intermediate said longitudinally-spaced closed portions,

d. a pace indicating member within said viscous fluid, said pace-indicating member having a density different from that of the viscous fluid causing movement of the member through the fluid at varying rates that are controlled by the angle of the tube as it relates to the horizontal,

e. means for positioning said tube along a lateral margin of the reading matter, on a surface whereby movement of the pace-indicating member operates in the reader's peripheral vision, providing continuous pacing (as opposed to timing) of the reading process, and

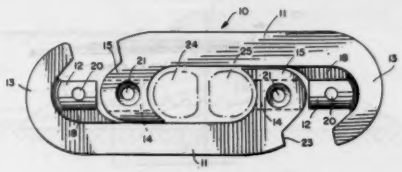
f. a curved angle indicating means on one end of the pacer tube carrying indicia correlated to the slope of the straight portion of the reading pacer tube, a fluid in said curved portion of the reading pacer tube, and a slope indicating member moveable along said indicia.

4,090,357

CONNECTING LINK

Floyd O. Smith, Portland, Oreg., assignor to ESCO Corporation, Portland, Oreg.

Filed Jun. 29, 1977, Ser. No. 811,450
Int. Cl.² F16G *15/04*
U.S. Cl. 59—85 **7 Claims**



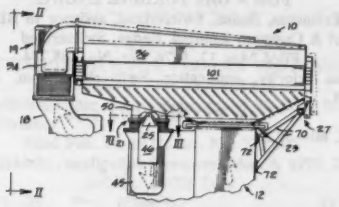
1. A connecting link comprising a pair of identical generally C-shaped elongated elements, each of said elements having an interior pin at a first end and an interior pin-receiving aperture at a second end, the interior of said first end of each of said elements being contoured to mate with the exterior of said second end of the other of said elements whereby said link is assembled by first moving said elements transversely of each other to position said second end of each of said elements within said first and second ends of the other of said elements and thereafter moving said elements longitudinally of each other to engage said pins and apertures.

4,090,358

HEAT EXCHANGER SUPPORT SYSTEM

D. Craig Young, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 1, 1976, Ser. No. 728,669
Int. Cl.² F02C *7/10*
U.S. Cl. 60—39.51 R **5 Claims**



1. A mounting system for interconnecting a gas turbine engine with a heat exchanger allowing differing thermal expansion in said heat exchanger and said gas turbine engine, said heat exchanger including a first compartment and a second compartment, the mounting system comprising;

air-in manifold means allowing translational motion of the heat exchanger towards and away from said gas turbine engine for communicating relatively cool gases exhausted from said gas turbine engine to said first compartment;

air-out manifold means allowing rotational motion of said heat exchanger about a lateral axis relative said gas turbine engine and said heat exchanger for communicating said relatively cool gases from said first compartment to said gas turbine engine;

gas-in manifold means allowing translational movement in the longitudinal axis of said gas turbine engine and said heat exchanger for communicating exhaust gases from said gas turbine engine to said second compartment;

and bracket means acting in cooperation with the air-out manifold means for limiting vertical and horizontal motion of said heat exchanger.

4,090,359

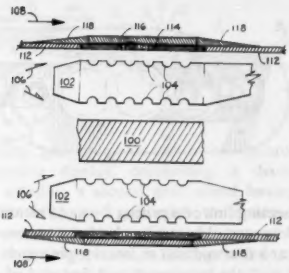
RADIANT ENERGY POWER SOURCE FOR JET AIRCRAFT AND MISSILES

Oscar Leonard Doellner, 4426 E. 22nd St., Tucson, Ariz. 85711

Filed Jun. 10, 1976, Ser. No. 694,719

Int. Cl.[2] F02G *1/00*; H01L *31/04*

U.S. Cl. 60—39.69 R **27 Claims**



1. A combined jet engine radiant energy power source comprising radiant energy transparent means proximate the radiant energy source combustion chamber of the jet engine, photovoltaic cell means having a defined spectral response bandwidth juxtaposed said radiant energy transparent means, thermal mass means thermally connected to said photovoltaic cell means; and means holding said radiant energy transparent means, photovoltaic cell means, and thermal mass means proximate the radiant energy source whereby radiated energy from the engine passing through said transparent means falls on said photovoltaic cell means to generate electrical power.

4,090,360

SINGLE CHAMBER TYPE COMBUSTION STRUCTURE FOR A GAS TURBINE ENGINE

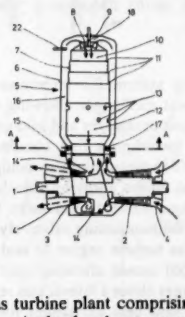
Oskar Erismann, Baden, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed May 12, 1976, Ser. No. 685,774

Claims priority, application Switzerland, Jun. 25, 1975, 8238/75

Int. Cl.[2] F02C *3/14, 9/14*

U.S. Cl. 60—39.29 **1 Claim**



1. An industrial gas turbine plant comprising a compressor coupled to a turbine, a single chamber type combustion structure interposed between said compressor and turbine for receiving compressed air from the compressor and delivering hot combustion gas to the turbine inlet, said single chamber combustion structure comprising concentric inner and outer walls forming an annular duct therebetween, one end of said annular duct being connected to the outlet from said compressor and the other end of said annular duct leading into one end of the combustion zone formed within said inner wall through a rotatable vortex blading surrounding a fuel burner, the other end of said combustion zone being connected to the inlet to said turbine, and a circular assembly of circumferentially spaced air deflector vanes located in said annular duct adjacent the compressed air inlet thereto, said deflector vanes being adjustable independently of each other about an axis extending radially of said combustion chamber structure through a range between positions transverse and parallel respectively to the direction of air flow through said annular duct, and said vanes being disposed at different angles around said annular duct to compensate out non-uniformities in air flow from the outlet of said compressor into said annular duct thereby to achieve a uniform distribution of air flow through said duct to said rotatable vortex blading.

4,090,361

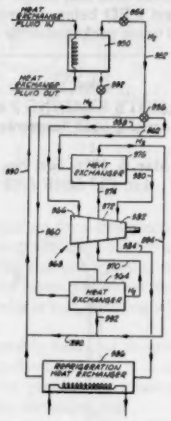
POWER CYCLES BASED UPON CYCLICAL HYDRIDING AND DEHYDRIDING OF A MATERIAL

Lynn E. Terry, 22 Suncrest Ave., Bridgeton, N.J. 08302, and Roger J. Schoeppel, P.O. Box 971, Stillwater, Okla. 74074

Filed Mar. 15, 1976, Ser. No. 666,786

Int. Cl.[2] F01K *25/10*

U.S. Cl. 60—649 **2 Claims**



1. A method for deriving power from a low-grade thermal energy source comprising:

combining hydrogen gas with a hydride-forming material under conditions of temperature and pressure such that a hydride saturated with, and in equilibrium with, hydrogen gas is formed;

heating the hydride at constant volume to a temperature above the equilibrium temperature of the hydride to activate the hydride by chemically compressing the hydrogen gas;

transferring heat to the hydride and concurrently initially releasing a first quantity of hydrogen gas therefrom;

conveying said initially released first quantity of hydrogen gas from the hydride to a power producing expansion device;

expanding the first quantity of hydrogen gas through said power producing expansion device to produce power and cool the hydrogen gas;

passing at least a portion of the cooled first quantity of hydrogen gas from the expansion device in heat exchange relation to a second quantity of hydrogen gas released from said hydride after said first quantity upon continuing to transfer heat to said hydride to reduce the temperature of said second quantity of hydrogen gas released from said hydride;

conveying said second quantity of released hydrogen gas from the point of said heat exchange to a power producing expansion device;

expanding said second quantity of hydrogen gas through said power producing expansion device to produce power and cool the expanded second quantity of said hydrogen gas to a temperature lower than that to which said first quantity of hydrogen gas is cooled upon expansion through said expansion device;

passing at least a portion of the cooled second quantity of hydrogen gas from said expansion device into heat exchange relation to a third quantity of hydrogen gas released from said hydride after said first and second quantities upon continuing to transfer heat to said hydride; and

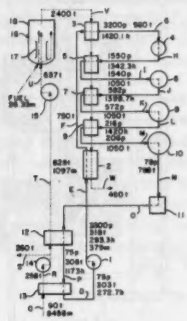
expanding said third quantity of hydrogen gas through said power producing expansion device to produce power and cool said third quantity of hydrogen gas to a temperature lower than the temperature to which said first and second quantities of hydrogen gas are cooled upon expansion through said power producing expansion device.

4,090,362

EXTERNAL COMBUSTION POWER CYCLE AND ENGINE WITH COMBUSTION AIR PREHEATING

Robert F. Bourque, 2756 Mission Blvd., San Diego, Calif. 92109

Filed Aug. 23, 1976, Ser. No. 716,973
Int. Cl.[2] F01K *13/00, 15/02, 17/06*
U.S. Cl. 60—679 **5 Claims**



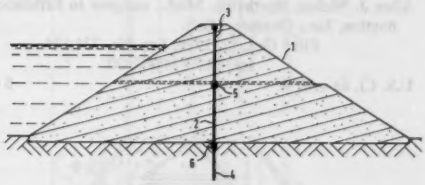
1. An integrated process for producing power from fuel and combustion inlet air comprising a Rankine-type thermodynamic cycle in which the thermodynamic working fluid is water, said thermodynamic cycle including the steps of pressurizing the water in liquid state, vaporizing the water to a superheated vapor by transferring to it the heat resulting from the combustion of fuel and air, expanding the heated vapor in a series of thermodynamic work-producing stages in which the volume expansion ratio of the last stage is less than four-to-one, reheating the vapor between each of said thermodynamic expansion stages so that said vapor after exiting the last expansion stage is superheated to a temperature of at least 350° F, desuperheating said superheated vapor after expansion by transferring all of its superheat energy to said air for combustion, condensing said desuperheated vapor back to liquid so as to repeat the cycle by transferring all of its vapor energy to ambient air, and extracting a portion of ambient air, after being heated by said condensing fluid for use as said air.

4,090,363

DAM OF EARTH OR ROCK FILL HAVING IMPERVIOUS CORE

Franz List, Hausham, and Franz Scheul, Munich, both of Germany, assignors to Heilmann & Littmann, Bau-Aktiengesellschaft, Munich, Germany

Filed Dec. 16, 1975, Ser. No. 641,175
Claims priority, application Germany, Dec. 17, 1974, 2459691; Oct. 24, 1975, 2547717
Int. Cl.[2] E02B *7/00*
U.S. Cl. 61—31 **14 Claims**



1. A retaining dam for a body of water comprising:

(a) a foundation substantially impervious to water;

(b) a plate-shaped core extending upward from said foundation,

(1) said core being substantially impervious to water and having two vertically extending major faces,

(2) said core including a plurality of superposed wall sections and joint means connecting each section to a superposed section for limited pivotal movement,

(3) each section having two opposite faces and a horizontally extending face connecting said opposite faces and abuttingly engaging a corresponding face of another wall section, said opposite faces of said sections jointly constituting said major faces,

(4) each joint means including a body of tough, yieldable material engaging in area contact one of the opposite faces of each wall section and the corresponding face of the superposed wall section; and

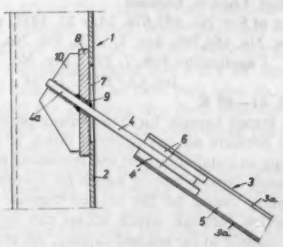
(c) particulate fill resting on said foundation and covering said major faces and said joint means.

4,090,364

MOUNTING DEVICE FOR FIXEDLY FASTENING A PILE TO A SHEET PILING

Günther Müller, Unter dem Gedankenspiel 32, 3550 Marburg, Lahn, Germany

Filed Feb. 28, 1977, Ser. No. 772,640
Claims priority, application Germany, Mar. 6, 1976, 2609402
Int. Cl.[2] E02D *5/74*
U.S. Cl. 61—39 **15 Claims**



1. A force-transmitting device for securing a pile to an erected sheet piling for stabilizing the same in its position, said device comprising in combination: a pile to be secured at one end to a sheet piling, and a sheet piling having on its side to be

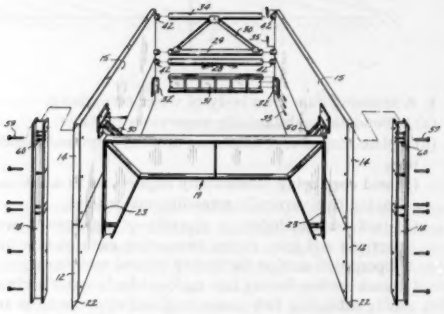
secured to the pile a hollow protrusion including a cut-out on its outwardly facing side, said protrusion defining a space within the sheet piling; a pull bar extending at one end through said cut-out into said space, and a support member fixedly secured to said end of the pull bar and disposed within said protrusion and abutting against the adjacent inside wall surface of the sheet piling fixedly secured to said wall surface, the other end of the pull bar being fixedly secured to said pile.

4,090,365

PORTAL FRAME FOR TRENCH BOX STACK

Allen J. Nieber, Northville, Mich., assignor to Efficiency Production, Inc., Okemos, Mich.

Filed Oct. 12, 1976, Ser. No. 731,131
Int. Cl.[2] E21D *5/00*
U.S. Cl. 61—41 A **5 Claims**



1. A portal frame trench box stack comprising:
a plurality of pairs of spaced-apart trench box panels comprising together a trench box stack;
a pair of spaced-apart upright wide flange structural members of a height substantially equal to the height of said trench box stack;
a truss-like peripherally flanged structural arch element secured to the inside flanges of said upright members at the upper ends thereof and including means through said flanges of said truss-like element and said flanges of said upright members to grip said trench box stack in rigid relation; and
spreader elements in said trench box stack maintaining, with said wide flange structural members and said arch element, a relatively rigid construction.

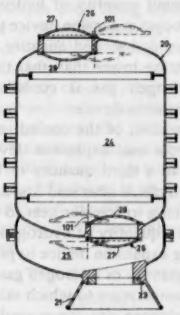
4,090,366

TRANSIT CAPSULES

Kenneth Ball, Hightown, England, assignor to Vickers-Intertek Limited, London, England

Division of Ser. No. 685,676, May 12, 1976, which is a division of Ser. No. 456,769, Apr. 1, 1974, Pat. No. 3,968,656. This application Feb. 7, 1977, Ser. No. 766,007
Int. Cl.[2] B63C *11/34*
U.S. Cl. 61—69 R **8 Claims**

1. A transit capsule for transporting personnel in an atmospheric pressure air environment down to a sea-bed capsule enclosing an installation part and remaining in use full of water, said transit capsule having means for co-operating with complementary means on the sea-bed capsule to form a sealed conjunction through which access can be gained from the transit capsule to the sea-bed capsule, the improvements residing in the provision in the transit capsule of an expansion vessel for receiving that small part of the virtually incompressible water in the conjunction and sea-bed capsules which corresponds to the difference in the amounts of water held thereby at a pressure corresponding to the hydrostatic head of the sea depth and at atmospheric pressure, of means for selectively connecting the expansion vessel to the conjunction and sea-bed capsules for the passage of the said small part into the expansion chamber and allowing the pressures in all three capsules to equal each other and the atmospheric pressure in the transit capsule, and of means for inspecting said small part.

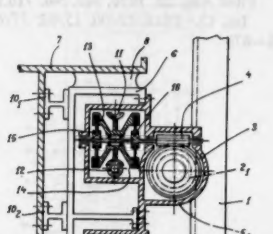


4,090,367

OFFSHORE DRILLING PLATFORM WITH VERTICALLY MOVABLE LEGS

Pietrus J. M. Verschure, 17 Prinses Marykestraat, Amsterdam, Netherlands

Filed Apr. 6, 1976, Ser. No. 674,735
Int. Cl.[2] E02B *17/08*
U.S. Cl. 61—91 **5 Claims**



1. An offshore drilling platform having a plurality of legs that support the platform, each of said legs having a rack thereon comprised by a plurality of vertically spaced teeth, drive pinions carried by the platform, each said pinion engaging the teeth of a said rack, and means to drive each said pinion selectively in opposite directions, said drive means including a pair of free wheels one of which permits free relative movement between the platform and legs in only one vertical direction and the other of which permits free relative movement of the platform and legs in only the other vertical direction, and means for selectively engaging each of said free wheels in a drive train to each of said pinions whereby when the bottoms of the legs are adjacent the sea floor and the platform is adjacent the water level, one of said selective engaging means can be engaged and the other disengaged to utilize wave action of the sea to move the platform and legs relative to each other in the same direction that the pinions drive the platform and legs relative to each other, thereby to reduce the time when the

lower ends of the legs can hammer on the sea bottom under said wave action.

4,090,368

OFFSHORE PLATFORMS

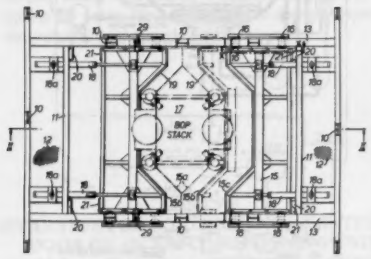
Arthur Oswald Bell, Woking, and William Antony John Reardon Smith, Windelsham, both of England, assignors to Danbury Drilling Limited and Reardon Smith Exploration Limited, both of London, England

Filed Dec. 8, 1975, Ser. No. 638,327

Claims priority, application United Kingdom, Dec. 19, 1974, 55059/74

Int. Cl.² E02B *17/00*

U.S. Cl. 61—93 **12 Claims**



1. An offshore platform that enables heavy equipment to be raised and lowered and held in situ in an intermediate position comprising a deck with an aperture therethrough, a pair of clamping and support members slidably mounted on said deck, said clamping and support members having ends adjacent the aperture for selectively clamping the equipment in situ when the equipment is positioned in the aperture, a separate fluid actuated ram means associated with each of said clamping and support members for driving the ends of said clamping and support members so they are selectively moved: (a) away from each other into a retracted position clear of said aperture, (b) toward each other into an extended position in which said clamping support members extend into said aperture to form a platform for supporting the heavy equipment to be lowered through said aperture, and (c) towards each other into an intermediate position within said aperture in which the ends engage and support heavy equipment extending through said aperture; and latch means for retaining said clamping and support means in their retracted and extended positions, respectively.

4,090,369

METHOD AND AN INSTALLATION FOR THE REFRIGERATION BY DISCONTINUOUS CHARGES OF OBJECTS IN BULK

Raymond J. F. Le Diouron, Grenoble, France, assignor to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

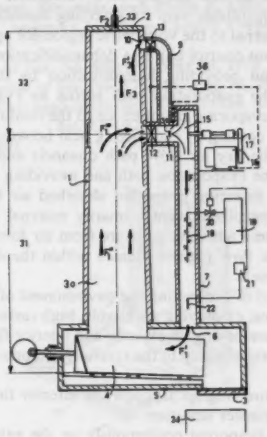
Filed Jun. 9, 1976, Ser. No. 694,466

Claims priority, application France, Jun. 12, 1975, 75 18341

Int. Cl.² F25D *13/06*

U.S. Cl. 62—63 **6 Claims**

1. A refrigeration installation comprising a thermally-insulated refrigeration tunnel, a first end orifice located at one extremity of said tunnel and a central orifice located at an intermediate position of said tunnel, a main recycling conduit incorporating gas-circulation means and injection means for liquefied gas, and further comprising a second end orifice at the other extremity of said refrigeration tunnel and an auxiliary recycling conduit connecting said second end orifice to said main recycling conduit at a connection point on the upstream side of said gas-circulation means, a first valve arranged directly in said auxiliary recycling conduit between said connec-



tion point and said second end orifice, and a second valve between said connection point and said central orifice.

4,090,370

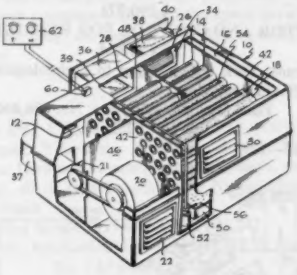
ENVIRONMENTAL CONTROL SYSTEM

Kenneth F. Vaughan, 3610 Michelle Dr., Torrance, Calif. 90503

Filed Mar. 11, 1976, Ser. No. 665,968

Int. Cl.² F25D *17/06*; F28D *3/00, 5/00*; B01F *3/02*

U.S. Cl. 62—91 **34 Claims**



1. A climatic environment control unit for altering temperature and humidity of a generally confined volumetric region comprising:

means defining a dry air flow path having plural flow path channels, the channels having water absorbent exterior coverings, a dry air flow path inlet for collecting air from the confined volumetric region and a dry air flow path outlet remote from the dry air flow path inlet, the dry air flow path outlet for expelling dry flow path air to the volumetric region, and means disposed along the dry air flow path for forcing air therethrough;

means defining an evaporation flow path including the exterior channel coverings, comprising an evaporation path inlet and evaporation path outlet means and including means for forcing air through the evaporation path, the evaporation path defining multiple flows interposed between and about the exterior channel coverings to provide a high wet areal surface contact traversed by air in the evaporation path and an efficient heat transfer relationship between air in the evaporation and dry air flow paths; and in which

said evaporation outlet means comprises first and second controllable vents, the first controllable vent for directing humidified air into the confined volumetric region, the second controllable vent for directing humidified air primarily external to the volumetric region for operating the environment control unit in a dehumidification mode, the control unit providing humidification by directing air through the evaporation path across an evaporant and expelling evaporant absorbed air to the confined volume, providing cooling by exchanging heat between air forced through the dry air flow path channels and air forced through the evaporation path and providing dehumidification by directing evaporant absorbed air through the second controllable vent primarily external to the confined volume whereby moisture from air forced through the dry air flow path condenses within the dry air flow path channels.

29. A method of controlling the environment of a generally confined volume, employing a wettable, high surface area heat transfer structure having an exterior and interior flow paths in heat exchange relationship to the exterior, comprising the steps of:

selectively directing air through the interior flow paths of the heat transfer structure:

spraying an evaporant continuously on the exterior of the heat transfer structure; and

continuously blowing air across the exterior of the heat transfer structure; and in which

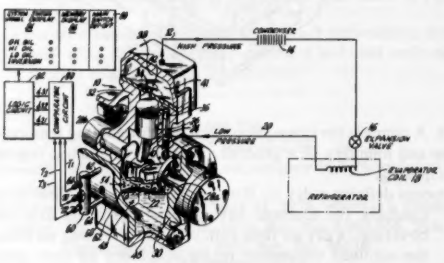
the air blowing across the exterior of the heat transfer structure is directed away from air directed through the interior flow paths; and

the steps of directing air through the interior flow paths and spraying an evaporant is selected to be such that condensation occurs within the interior flow path, dehumidifying the air passed therethrough.

4,090,371
MONITOR AND CONTROL FOR REFRIGERATION SYSTEM

James Keane, York, Pa., assignor to Technological Enterprises Corp., Southboro, Mass.

Filed Nov. 24, 1975, Ser. No. 634,846
Int. Cl.[2] F25B 43/02
U.S. Cl. 62—129 8 Claims

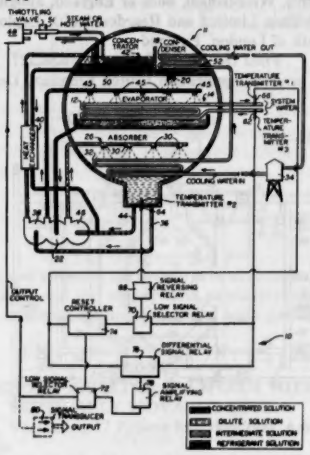


1. A device for detecting physical and thermodynamic conditions of liquid fluids at specified points respectively within an operating mechanical refrigeration system comprised of means for positioning in vertically spaced relationship within a refrigeration system a plurality of electronic sensors responsive to the rate of ambient heat dissipation of fluids at specified points within the refrigeration system, electronic means responsive in its input to distinguish between two or more different liquids, and adapted in its output signals to distinguish between sensor voltage relationships characteristic of normal operating conditions at the specified points and sensor voltage relationships characteristic of abnormal conditions precursing malfunction of the system.

4,090,372
FUEL CONSERVATION CONTROLLER FOR CAPACITY CONTROLLED REFRIGERATION APPARATUS

Jeffrey Wayne Lamb, 172-41 Highland Ave., Jamaica Estates, N.Y. 11432

Filed Mar. 21, 1977, Ser. No. 779,735
Int. Cl.[2] F25B 15/00
U.S. Cl. 62—141 16 Claims



1. A control system capable of controlling the refrigeration capacity of a refrigeration system adapted for cooling a fluid medium, said refrigeration system including a refrigerant; an absorbent having an affinity for said refrigerant; evaporator means for bringing said refrigerant into heat transfer relationship with said fluid medium, said evaporator means having an inlet for receiving fluid medium to be cooled and an outlet for discharging cooled fluid medium; absorber means in communication with said evaporator means for removing refrigerant vapor therefrom; means for supplying a concentrated absorbent-refrigerant solution to said absorber means; means for cooling said absorber means to maintain the pressure therein below the pressure in said evaporator means whereby said refrigerant vapor migrates to said absorber means to combine with said concentrated solution to produce a dilute solution; concentrator means for removing a portion of said refrigerant from said dilute solution for recirculation to said evaporator means and for providing said concentrated solution; means for supplying dilute solution to said concentrator means for controlling the concentration of said concentrated solution supplied to said absorber means for controlling the refrigeration capacity of said system, said control system comprising:

means disposed for sensing the variations in temperature at said evaporator inlet and outlet and within said absorber means for providing first, second and third tracking signal outputs indicative of said sensed temperature variations, said first tracking signal output being indicative of the variations in temperature of said fluid at said evaporator inlet, said second tracking signal output being indicative of the variations in temperature of said fluid at said evaporator outlet and said third tracking signal output being indicative of the variations in temperature within said absorber means;

first comparator means operatively connected to said first and third tracking signal outputs for comparing said first and third tracking signals and selecting one of said tracking signals dependent on its relative value as compared with the other of said tracking signals and for providing a first control signal output indicative of said one selected tracking signal;

reset control means operatively connected to said second tracking signal output and to said first control signal out-

put for providing a second control signal output dependent on the relative values of said second tracking signal and said first control signal;

difference means operatively connected to said first and second tracking signal outputs for providing a third control signal output indicative of the difference between said first and second tracking signals; and

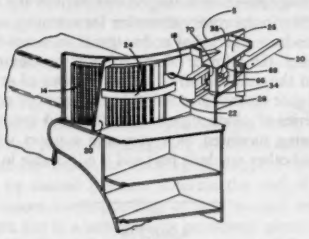
second comparator means operatively connected to said second and third control signal outputs for comparing said second and third control signals and selecting one of said last mentioned control signals dependent upon its relative value as compared with the other control signal and for providing a fourth control signal output indicative of said one selected control signal, said fourth control signal output being connected to said concentration control means for controlling the operation thereof dependent on the value of said fourth control signal.

4,090,373

APPARATUS FOR CONTROLLING AN INTERNAL DOOR OF AN AIR CONDITIONING UNIT

Richard D. Lang, Chittenango, and Theodore S. Bolton, Liverpool, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Jan. 24, 1977, Ser. No. 761,825
Int. Cl.² F25D *23/12*
U.S. Cl. 62—262 **14 Claims**



1. In an air conditioning unit having a casing, a partition dividing the unit into an evaporator section and a condenser section, an evaporator fan in the evaporator section of the unit and a condenser fan in the condenser section of the unit,

means defining a port in the partition;

a door for opening and closing the port;

means for mounting the door for movement between port opening and closing positions, said mounting means including spring means biased to hold the door in a predetermined position; and

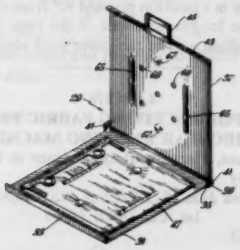
means for moving the door, said door moving means including a ramp with a multiplicity of surfaces, displaceable carriage means movable in relation to the ramp, a pin associated with the carriage means and in contact with the ramp, and activating means extending from the carriage means whereby upon the application of force to the carriage means, the carriage means is displaced against the action of the spring with the pin following a path defined by certain of the ramp surfaces so that the door is moved to a first preselected position and maintained therein and upon a subsequent application and release of the force the pin follows a path defined by other of the ramp surfaces with consequent moving of the door to a second preselected position and maintained therein.

4,090,374

APPARATUS FOR CRYOGENIC FREEZING OF FLUID FILLED POUCHES

Clifford C. Faust, Riverside, and Philip F. Cilia, Bridgeview, both of Ill., assignors to Union Carbide Corporation, New York, N.Y.

Continuation of Ser. No. 580,170, May 23, 1975, abandoned, which is a division of Ser. No. 176,214, Aug. 30, 1971, Pat. No. 3,952,536. This application Sep. 8, 1977, Ser. No. 831,425
Int. Cl.² F25C *5/14*
U.S. Cl. 62—341 **7 Claims**



1. Apparatus for cryogenically freezing fluids in a flexible, slack filled pouch into a thin, layer-like package article comprising:

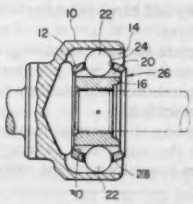
a restraining plate set with two substantially flat parallel planar plates capable of thermal conductivity at cryogenic temperatures, said plates being separable to permit enclosure therebetween of said slack filled pouch to be frozen, each of said plates having edge closure returns on one side thereof and return-free edges along the sides other than said edge closure return side, the interior surface planarity of at least one of said plates having a protrusion extending into less than completely through the space between said plates when they are disposed in their parallel planar orientation.

4,090,375

CONSTANT VELOCITY UNIVERSAL JOINT

Koichi Takahashi, Yokohama; Nobuteru Hitomi, Yokosuka; Taisuke Kizu; Hirotugu Honchi, both of Fujisawa, and Kazuo Arita, Atsugi, all of Japan, assignors to Nissan Motor Company, Ltd., Japan

Filed May 7, 1976, Ser. No. 684,242
Claims priority, application Japan, May 8, 1975, 50-55172
Int. Cl.² F16D *3/00*
U.S. Cl. 64—21 **14 Claims**



1. A constant velocity universal joint comprising:

an outer joint element having a spherical inner surface and a plurality of grooves on its spherical inner surface;

an inner joint element having a spherical outer surface and a plurality of grooves on its spherical outer surface opposite from said outer element grooves to define pairs of opposed grooves;

a cage having a first spherical surface on its outer face coacting with the spherical inner surface of the outer joint

element and a second spherical surface on its inner face coacting with the spherical outer surface of the inner joint element;

a plurality of balls guided in the pairs of opposed grooves, respectively, for transmitting torque between the inner and outer joint elements;

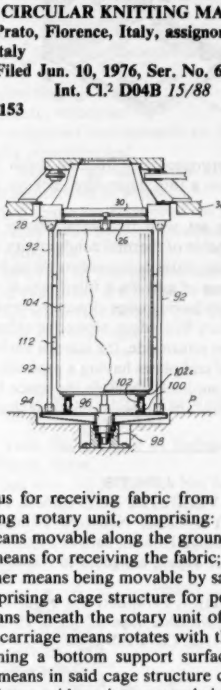
the cage having a plurality of ball apertures receiving the balls, respectively, the ball apertures having the same size, the outer face of the cage being recessed from the first spherical surface at an area adjacent at least one of the ball apertures to provide a relief of a ridge between two adjacent grooves of the outer joint element upon axially inserting the cage in a position pivoted 90° from its final position wherein the longituindal axis of the cage is aligned with the longitudinal axis of the outer joint element.

4,090,376

APPARATUS FOR RECEIVING FABRIC PRODUCED BY A CIRCULAR KNITTING MACHINE

Edo Pacini, Prato, Florence, Italy, assignor to FIMEC S.p.A., Florence, Italy

Filed Jun. 10, 1976, Ser. No. 694,843
Int. Cl.[2] D04B *15/88*
U.S. Cl. 66—153 **13 Claims**



1. Apparatus for receiving fabric from a circular knitting machine having a rotary unit, comprising:

carriage means movable along the ground;

container means for receiving the fabric;

said container means being movable by said carriage means;

means comprising a cage structure for positioning said carriage means beneath the rotary unit of the machine such that said carriage means rotates with the rotary unit;

means defining a bottom support surface to support said carriage means in said cage structure comprising a rotatable platform;, said carriage means being movable off said rotable platform

said cage structure further comprising a series of rods extending upwardly from said platform to the rotary unit such that the rods link said platform to the rotary unit for rotation therewith; and,

means for centering said carriage means in an engaged position beneath the rotary unit to insure that said carriage means rotates coaxially with the rotary unit.

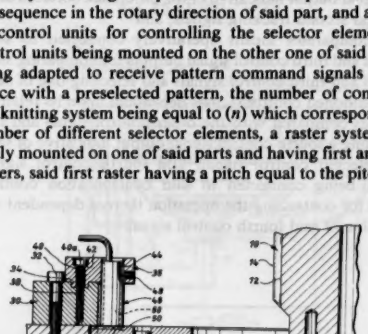
4,090,377

CIRCULAR KNITTING MACHINE

Jochen Blank, Hebsack, and Günter Glück, Stetten, Fildern, both of Germany, assignors to C. Terrot Soehne GmbH. & Co., Stuttgart, Germany

Filed Jul. 13, 1976, Ser. No. 704,967
Claims priority, application Germany, Jul. 18, 1975, 2532135
Int. Cl.[2] D04B *15/66, 15/78*
U.S. Cl. 66—154 A **11 Claims**

1. In a circular knitting machine having a plurality of knitting systems and a first stationary part and a second part rotatable relative to said first stationary part, an improved arrangement for producing synchronization pulses for pattern control, the improvement comprising a plurality of different types of selector elements which are mounted one after the other equidistantly according to a pitch of one of said parts and in cyclical sequence in the rotary direction of said part, and a plurality of control units for controlling the selector elements, said control units being mounted on the other one of said parts and being adapted to receive pattern command signals in accordance with a preselected pattern, the number of control units per knitting system being equal to (*n*) which corresponds to the number of different selector elements, a raster system operatively mounted on one of said parts and having first and second rasters, said first raster having a pitch equal to the pitch of said



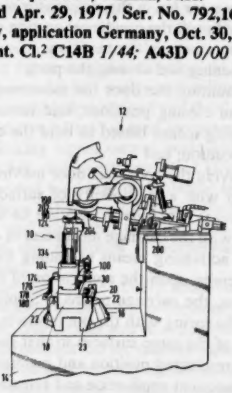
one of the parts and the second raster having a pitch equal to that of the first raster divided by the number (*n*) of different types of selector elements, pick-up means operatively mounted on the other machine part, said pick-up means including a first pick-up element which scans said first raster and produces a series of clock signals in accordance with such scanning, and second pick-up elements arranged one behind the other in a row extending in the rotary direction for scanning said second raster to produce a series of code signals, in accordance with such scanning, the number of second pick-up elements corresponding to the number (*n*) of different types of selector elements, and gate means for combining the series of code signals with the series of clock signals, said first and second pick-up elements being mounted on a common support which is secured to said other machine part and is adjustable in the rotary direction.

4,090,378

ROUGHING MACHINE HAVING ROCKABLE SHOE ASSEMBLY SUPPORT

Gerald Sommer, Pirmasens, Germany, assignor to International Shoe Machine Corporation, Nashua, N.H.

Filed Apr. 29, 1977, Ser. No. 792,166
Claims priority, application Germany, Oct. 30, 1976, 2650079
Int. Cl.[2] C14B *1/44;* A43D *0/00*
U.S. Cl. 69—6.5 **7 Claims**



1. A machine for roughing the margin of an upper of a shoe

assembly, said shoe assembly comprising a last having an insole located on its bottom and the upper mounted thereon and being secured to the bottom of the insole, the heel and forepart portions of the shoe assembly lying in intersecting planes, comprising: a shoe assembly support for supporting the shoe assembly bottom-up; a margin sensor engageable with the upper margin; a side sensor, located below the margin sensor, engageable with the side of the shoe assembly; a roughing tool located above the support, inwardly of the side sensor, and proximate to the margin sensor and engageable with the upper margin to rough the upper margin; means mounting both sensors and the roughing tool for unitary heightwise movement; means mounting both sensors and the roughing tool for unitary inward-outward movement in a particular direction; support moving means for so moving the support as to move succeeding upper margin portions past the margin sensor and as to move corresponding succeeding side portions of the shoe assembly past the side sensor to thereby move said margin portions past the roughing tool, said support moving means comprising means for so rotating the support 180 degrees about a vertical axis in a particular rotational direction as to rotate a first end of the upper margin past the roughing tool, means for thereafter so horizontally moving the support linearly as to move a side of the upper margin past the roughing tool, and means for thereafter so rotating the support 180 degrees about said vertical axis in said particular direction as to rotate the second end of the upper margin past the roughing tool; means enabling the margin sensor to move heightwise and follow the contour of said upper margin portions to thereby enable the roughing tool to move heightwise accordingly; and means enabling the side sensor to move inwardly-outwardly in said particular direction and follow the contour of said side portions to thereby enable the roughing tool to move inwardly-outwardly accordingly; the machine having the improvement comprising: means mounting the support for rocking movement between a first position and a second position about a horizontal axis that is transverse to the direction of said linear movement; means for initially retaining the support in said first position wherein the end of the shoe assembly bottom corresponding to said first end of the upper margin lies in a substantially horizontal plane; and triggering means actuable pursuant to said linear movement for rocking the support from its first position to its second position wherein the end of the shoe assembly bottom corresponding to said second end of the upper margin lies in a substantially horizontal plane; whereby a line extending from the area of engagement of the roughing tool with each portion of the ends of the upper margin along the surface of the engaged margin to the outer periphery of the margin portion and towards the area of engagement of the side sensor with the corresponding portion of the side of the shoe assembly will be substantially parallel to said particular direction.

4,090,379

AUTOMOBILE DOOR LATCH AND LOCK PROTECTING DEVICE AND METHOD FOR PREVENTING FREEZING OF DOOR LATCHES AND LOCKS

Walter H. Lehner, 1231 Pulaski St., Lincoln, Ill. 62656

Filed Feb. 9, 1977, Ser. No. 766,882

Int. Cl.[2] E05B *19/16*

U.S. Cl. 70—455 **1 Claim**

1. A method for preventing freezing of vehicle door latches and locks which comprises:

a. holding a sheet of water repellent, frangible material over said latch or lock;

b. bringing a flexible magnetic frame into magnetic contact with the vehicle door, said frame surrounding the latch or lock and sealing the frangible material to the vehicle door and providing a protective tent over said latch or lock;

c. leaving the frame and frangible material in place while the vehicle is exposed to the elements;

d. rupturing the frangible material to expose the protected latch or lock; and,

e. removing the frame and ruptured frangible material from the vehicle door.

4,090,380

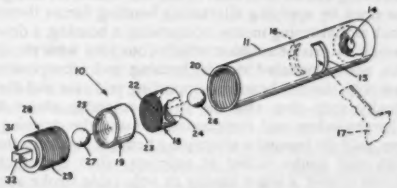
DETACHABLE KEY SECURITY ASSEMBLY

Eric L. Bianco, 120 E. Price St., Linden, N.J. 07036

Filed Mar. 16, 1977, Ser. No. 777,966

Int. Cl.[2] A47G *29/10*

U.S. Cl. 70—456 R **6 Claims**



1. A portable key securing assembly for rendering a key temporarily non-usable comprising,

a. an elongated housing,

b. a bore in said housing open at one end and having a closure abutment at the other end,

c. slot means providing a passage through the housing for extending a portion of a key to be secured into operative relation with the bore in said housing,

d. gripping means in said housing including, a pair of coacting vise jaws freely mounted in the bore in said housing with one of said coacting jaws on one side of the slot means and the other on the opposite side of said slot means to engage and disengage the portion of the key extended into the slot means through the housing,

e. at least one of said coacting jaws having a self centering means thereon to enable the coacting jaws to move into gripping alignment with the portion of the key extended into the slot means,

f. an actuator slidably mounted in the bore of said housing to abut and move at least one of said coacting jaws including, a stud for operating the actuator extending towards the open end of said bore and having a unique configuration on said stud, and

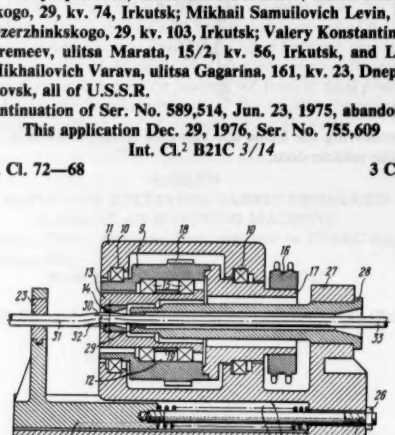
g. a mating wrench to fit the configuration of said stud and extendable into the bore in the housing to operate the actuator.

4,090,381

DEVICE FOR DRAWING-OFF AND STRAIGHTENING CYLINDRICALLY SHAPED STOCK

Mikhail Vladimirovich Babasov, ulitsa Tsentralnaya, 10, kv. 14; Viktor Afanasievich Zazimko, ulitsa Parizhskoi Kommuny, 20; Iraida Ivanovna Reidemeister, ulitsa Universitetskaya, 10, kv. 55; Jury Lukich Semenenko, ulitsa Gogolya, 1, kv. 30, all of Dnepropetrovsk; Zelik Ilich Pertsikov, ulitsa Dzerzhinskogo, 29, kv. 74, Irkutsk; Mikhail Samuilovich Levin, ulitsa Dzerzhinkskogo, 29, kv. 103, Irkutsk; Valery Konstantinovich Eremeev, ulitsa Marata, 15/2, kv. 56, Irkutsk, and Leonid Mikhailovich Varava, ulitsa Gagarina, 161, kv. 23, Dnepropetrovsk, all of U.S.S.R.

Continuation of Ser. No. 589,514, Jun. 23, 1975, abandoned.
This application Dec. 29, 1976, Ser. No. 755,609
Int. Cl.[2] B21C *3/14*
U.S. Cl. 72—68 3 Claims



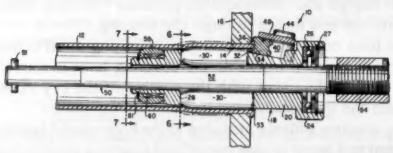
1. A device for drawing and straightening cylindrically shaped stock, mounted on a drawbench stand and comprising: a die case; a die fixed in said case; stock guides arranged along a drawing axis on both sides of said die; means for straightening the stock by applying alternating bending forces thereto; said stock straightening means, comprising: a housing, a drive rotor having an axis of rotation which coincides with the drawing axis, accommodated in said housing and incorporating said case with the die, bearings supporting said case and die eccentrically such that said die is non-rotatable about its axis; whereby when said rotor rotates during the drawing operation, said die transmits alternating bending forces to the stock, with said guides acting as supports when the stock being drawn is bent, a slider having an adjustable stroke adapted to reciprocate along an axis parallel to the drawing-off axis, one of said guides being disposed on the exit side of said drawing die and being fixed to said slider.

4,090,382

EXPANDING AND BEADING APPARATUS FOR TUBES AND THE LIKE

Donald E. Schott, Chester, Vt., assignor to Thomas C. Wilson, Inc., Long Island City, N.Y.

Filed Jan. 31, 1977, Ser. No. 764,295
Int. Cl.[2] B21D *39/06*
U.S. Cl. 72—119 18 Claims



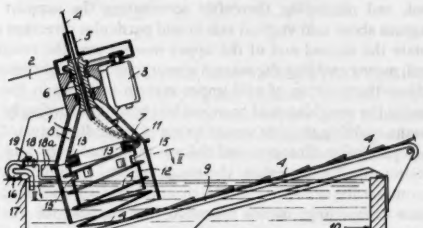
1. An apparatus for expanding and beading an end portion of a metal member positioned within an opening defined by an outer member, which comprises a housing having one end portion adapted to be inserted into one end portion of the tubular member, means mounted on said housing for expanding at least a part of the end portion of the tubular member outwardly into engaged relation with peripheral portions of the opening and for developing traction forces directed axially into the tubular member, means to engage and deform the end portion of said tubular member in its cold condition so as to form a generally arcuately configured peripheral bead thereabout when the housing is drawn inwardly of the tubular member by said inwardly directed forces, rotatably mounted means for rotatably engaging and supporting said beading means in a direction generally axial of the housing and the tubular member and for transmitting reaction forces to said beading means sufficient to cause said beading means to deform the end portion of the tubular member by cold working the end portion when the housing is drawn therein.

4,090,383

DEVICE FOR EXTRACTING WIRE ROD OR THE LIKE AT THE OUTLET END OF A ROLLING MILL

Giulio Properzi, Via Pietro Cossa, 1, Milan, Italy

Filed Feb. 24, 1977, Ser. No. 771,727
Claims priority, application Italy, Mar. 1, 1976, 20723 A/76
Int. Cl.[2] B21C *47/00*
U.S. Cl. 72—134 3 Claims



1. A device for extracting the end portion of wire rod or the like from the laying guide of a coiler disposed at the outlet of a rolling mill and having a rotatable laying cone supporting said laying guide, comprising an extractor cylinder idly supported by said laying cone of said coiler and coaxial thereto, said cylinder having an external diameter less than the internal diameter of the turns formed by said laying cone, and a length sufficient to comprise at least one of said turns, and means for maintaining a relative speed between said extractor cylinder and said laying cone, wherein said means for maintaining a relative speed between said extractor cylinder and said laying cone comprise a plurality of fixed nozzles arranged to feed fluid jets on to shaped surfaces of said extractor cylinder, the orientation of said jets and said surfaces being such as to create a couple opposing the rotation of said extractor cylinder in the direction of rotation of said laying cone.

4,090,384

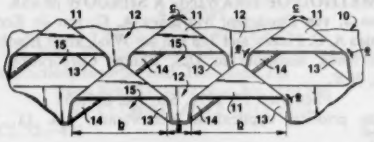
APPARATUS FOR FORMING A STRUCTURAL MEDIUM

William A. Wootten, 425 Via Corta, Malaga Cove Plz., Palos Verdes Estates, Calif. 90274

Division of Ser. No. 598,484, Jul. 23, 1975, Pat. No. 4,027,058.
This application May 18, 1977, Ser. No. 798,212
Int. Cl.[2] B21D *47/00*
U.S. Cl. 72—186 5 Claims

1. An apparatus for forming a structural medium by the slitting and folding of a planar web of material, comprising a pair of forming cylinders mounted for rotation in opposing directions in surface-to-surface engagement with one another, the periphery of each of said cylinders having a plurality of dies of triangular cross section mounted thereon and outstanding therefrom, each of said dies having a flat triangular top surface disposed in a plane parallel to the axis of its associated

cylinder and three side walls which extend respectively from the edges of said triangular top surface toward the periphery of said cylinder, a first one of said side walls in each die extending from a first edge of said top surface in a plane which is substantially orthogonal to the axis of said cylinder and the other two side walls extending from the other two edges of said top surface in inclined planes which are nonorthogonal to the axis of said cylinder and which diverge from one another toward the periphery of said cylinder, said dies being mounted in closely adjacent relation to one another in a plurality of circular rows about the axis of each of said cylinders, the dies on each cylinder having like orientation with the said first side walls of the dies in each row being in alignment with one another, the adjacent apices of adjacent dies in each row being spaced from one another by a distance in the range of 5% to 15% of the length of the said first edge of each die in said row, the apex of each die opposite to said first edge thereof having



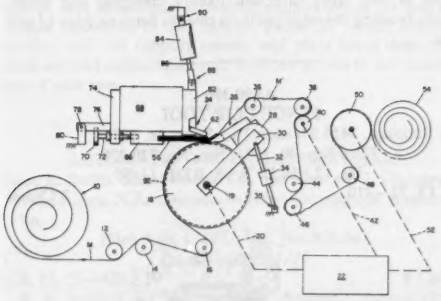
located adjacent to and being substantially similarly spaced from the space between the aligned first side walls of the dies in an adjacent one of said rows, the orientation of the triangular dies on one of said cylinders being opposite to the orientation of the triangular dies on the other of said cylinders to permit each triangular die on one of said cylinders to enter the triangular region between dies on the other of said cylinders as said cylinders rotate, the dies on said two cylinders being so positioned relative to one another that the said first side wall of each die on one cylinder cooperates with a complementary first side wall of a die in the other of said cylinders as it enters the region between dies on said other cylinder to shear a portion of a web fed to the nip of said contra-rotating cylinders while the other two side walls of the said die in said one cylinder cooperate with complementarily inclined side walls of dies in the said other cylinder to fold other portions of said web therebetween.

4,090,385

MATERIAL TREATING APPARATUS

Thomas D. Packard, Stoughton, Mass., assignor to Bird Machine Company, Inc., South Walpole, Mass.

Filed Jan. 26, 1977, Ser. No. 762,652
Int. Cl.[2] B21D *33/00*
U.S. Cl. 72—191 **12 Claims**



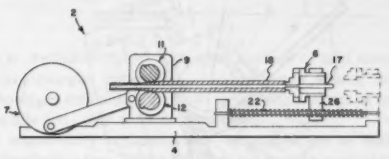
1. Apparatus for treating lengthwise traveling material comprising a driving member, the material-contacting surface of said driving member being provided with a multiplicity of alternating grooves and lands extending parallel to the direction of drive of the material by the driving member, presser means to press said material against said surface of said driving member, feed means arranged to feed the material into driven engagement with said face of said driving member in advance of said presser means and cooperating with said presser means to maintain sufficient widthwise tension on the material to keep it smooth, so that it engages the lands and bridges the grooves of said surface of said driving member, and a retarding member for deflecting the material away from said driving member, located on the same side of the material as said driving member, said retarder member comprising a multiplicity of alternating teeth and slots, said teeth extending into said grooves of said driving member from fixed ends located beyond said presser means in the direction of drive of the material and having their free ends disposed in said grooves of said driving member surface with clearance from the walls of said grooves, said slots receiving therethrough the lands of said driving member surface with clearance from the walls of said slots.

4,090,386

METHOD OF PRODUCING ZIRCALOY TUBES

Tom D. Naylor, and Ulf A. Matinlassi, both of Kennewick, Wash., assignors to Sandvik Special Metals Corporation, Kennewick, Wash.

Filed Mar. 21, 1977, Ser. No. 779,529
Int. Cl.[2] B21B *19/06*
U.S. Cl. 72—208 **4 Claims**



1. In a method for producing zircaloy tubes in which hydride inclusions form generally parallel to the inside and outside tube surfaces, carrying on a plurality of series of forming steps wherein each series includes the steps of, turning a pair of metal-forming rolls from a home position with the rolls having circumferential tube-forming grooves therein with tube-working surfaces which contact a cylindrical workpiece positioned between the rolls when the rolls turn through a primary tube-forming arc with said grooves positioned in mating relationship to provide a tube-forming zone, thereafter turning said rolls oppositely through a return rotation to said home position, the surface of each of said grooves in said rolls being generally arcuate in cross-section throughout and having a forming portion with a continuous surface which has an arcuate cross-section throughout with the radius of the arc decreasing longitudinally of the groove from a first zone to a second zone and with the groove extending from said second zone to a third zone as a finishing portion of said groove in which said substantially arcuate surface has substantially the radius of said surface at said second zone, said groove having a dwell portion extending between said first zone and said third zone within which said rolls do not contact a workpiece, advancing a cylindrical workpiece axially by controlled steps into and through said tube-forming zone, moving a substantially cylindrical mandrel within the workpiece simultaneously with each of said advancing steps of said workpiece with the diameter of the mandrel being substantially the internal diameter of said workpiece, said workpiece having an external radius which is substantially the same as the radius of said arc of said tube-working surface at said first zone and the axis of said workpiece being concentric with the axis of said surfaces of said grooves, moving said rolls together as a unit axially of the workpiece with an oscillating movement through a forward step relative to said tube-forming zone precisely counter to the direction of said step movement of said workpiece and mandrel and thereafter through a return step in the opposite direction

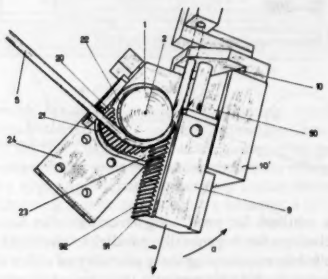
and for the same distance, synchronizing the rotation and movement of said rolls and the movements of said workpiece so that each movement of the workpiece and the mandrel occurs when said dwell portions of said grooves are in mating relationship, and so that said first zones of said grooves engage a workpiece simultaneously within said tube-forming zone with the start of said primary tube-forming rotation of said rolls and with the circumferential rate of movement of said grooves along the workpiece being substantially the same as the rate of movement of said rolls axially of the workpiece whereby said rolls rotate said tube-working surfaces in contact with the workpiece to produce a rolling action of said surfaces of said grooves along the workpiece due to the synchronous rotation of said rolls and the movement of the rolls axially of the workpiece.

4,090,387

BENDING-TOOL AND A DEVICE FITTED OUT WITH SUCH A TOOL

Serge Dubreuil, Chatou, France, assignor to S.A. Ermeto, La Verriere le Mesnil Saint Denis, France

Filed Nov. 26, 1976, Ser. No. 745,193
Claims priority, application France, Nov. 28, 1975, 75 36635
Int. Cl.[2] B21D *7/024*
U.S. Cl. 72—217 **3 Claims**



1. A tube bending apparatus comprising a base, a fixed shaft mounted on said base, a generally cylindrical bending member non-rotatably attached to said shaft, a supporting element movably mounted on said shaft, said supporting element including an elongated pressure applying member for engaging a substantial length of a tube to be bent and holding the tube in engagement with said bending member, means for moving said pressure applying member, and means for causing said pressure applying member to follow an involute curved path so that said pressure applying member moves around said bending member and bends the tube along a shifting point of contact without causing relative movement between the tube and said pressure applying member.

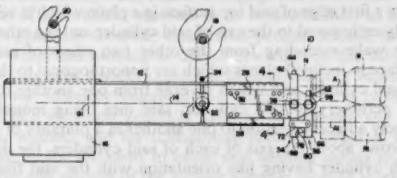
4,090,388

ROLL CHANGING APPARATUS

Norman Lester Pim, Salem, Ohio, assignor to Gulf & Western Manufacturing Company, Southfield, Mich.

Filed May 25, 1977, Ser. No. 800,339
Int. Cl.[2] B21B *31/10*
U.S. Cl. 72—239 **19 Claims**

1. Roll changing apparatus for a horizontal roll member including a roll end having a horizontal axis comprising, a first roll end engaging member including means defining a first bearing surface, a second roll end engaging member including means defining a second bearing surface, said first and second bearing surfaces receiving said roll end therebetween and engaging vertically aligned diametrically opposed axially spaced apart upper and lower portions of said roll end to support said roll horizontally as a cantilever, and support means supporting said first and second members for vertical displacement of said first and second members relative to one



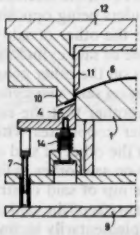
another transverse to said axis to displace said first and second bearing surfaces toward and away from one another.

4,090,389

METHOD OF DRAWING A SHADOW MASK

Adrianus J. van Denderen; Marianus A. G. van de Kerkhof; Mathias A. C. Peters, and Jan van der Waal, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 17, 1976, Ser. No. 697,051
Claims priority, application Netherlands, Jul. 11, 1975, 7508287
Int. Cl.[2] B21D *22/00*
U.S. Cl. 72—350 **4 Claims**



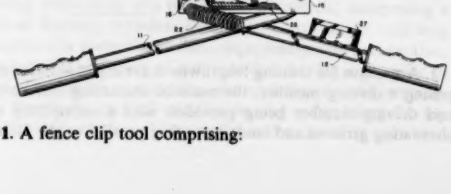
1. A method of drape drawing a shadow mask for a color cathode ray tube from a metal sheet which has a large number of apertures and a greater tensile strength in one direction than another, said method comprising the steps of: clamping edge portions of said sheet; drawing the central portion of said sheet over a draw die; and allowing selected edge portions that extend substantially in said one direction to slip in said other direction in response to tensile force exerted on said sheet by said drawing while holding other selected edge portions that extend in said other direction fixedly clamped; and subsequently bending the edge portions over to form an edge of said mask.

4,090,390

FENCE CLIP TOOL

Pete Barinaga, 3416 Meadow Dr., Boise, Id. 83704

Filed Sep. 30, 1976, Ser. No. 728,278
Int. Cl.[2] B21D *9/08*; B23P *11/00*
U.S. Cl. 72—410 **3 Claims**



1. A fence clip tool comprising:

a fence clip housing including opposing upper and lower walls, a pair of opposing upstanding side walls transversely mounted to said upper and lower walls, and a bottom wall transversely mounted to said upper and lower walls and said side walls whereby a fence clip pocket, operable to hold a fence clip with its legs horizontally extending, is defined, said upper and lower walls each having an opposing notch substantially in the center thereof adapted to receive vertically spaced steel fence post projections; and

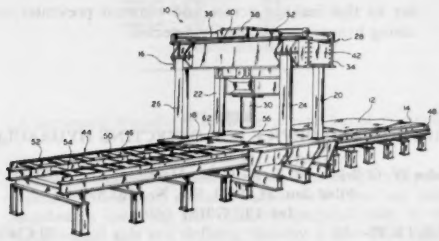
a pair of opposing arms axially mounted and journaled for rotation in said housing, each of said arms having at its terminal end a cylindrical, transverse, jaw operable to engage an extending leg of a fence clip to bend the leg about a fence post, closure of said jaws being effected by actuating the ends of said arms opposite the jaws toward one another.

4,090,391

PRESS CONSTRUCTION

Joseph R. Hish, Franklin Park, Ill., assignor to Industrial Steel Construction, Incorporated, Hodgkins, Ill.

Filed Feb. 22, 1977, Ser. No. 770,798
Int. Cl.[2] B21D *43/12*; B21J *13/04*
U.S. Cl. 72—422 **6 Claims**



1. In a press for straightening or cambering metallic workpieces including a fixed press frame, a carrier means for longitudinally conveying said workpiece onto a work table positioned in said frame, a ram in said frame operable in a vertical direction for impacting said workpiece, the combination comprising means for effecting lateral movement of said ram above said work table to a position outward of the lateral edges of said work table to facilitate loading and unloading of said workpiece on said work table and to allow said ram to impact said workpiece at any lateral point including the lateral edges thereof, said ram moving means including a carriage from which said ram is suspended and rails on which said carriage moves, said press frame including support means for said rail, a plate connected to said support means for rigidly interconnecting said rail support means, said plate being detachable from said rail support means to facilitate access to and maintenace of said ram.

4,090,392

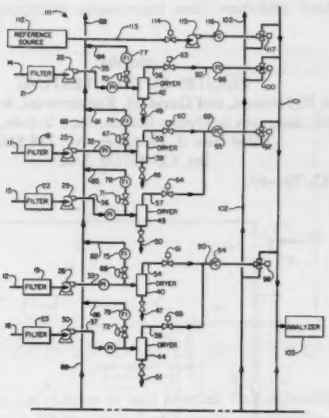
AUTOMATIC GAS ANALYZER SYSTEM

Isaac L. Smith, Baton Rouge, La., and Clarence I. Glassbrook, Swedesboro, N.J., assignors to Ethyl Corporation, Richmond, Va.

Filed Aug. 1, 1977, Ser. No. 820,847
Int. Cl.[2] G01N *1/26*
U.S. Cl. 73—421.5 R **8 Claims**

5. A method for automatically supplying sequentially a number of gas samples for analysis using an apparatus including an analyzer, a source of zero sample, connected to said analyzer, a reference source for calibrating said analyzer and a number of sample sources, each of which has serially connected in the sample line a filter, a pump, a pressure controlled vent means and a first control valve and having a number of said sample sources connected to a second control valve which in turn is connected to a second vent means and to the analyzer by means of a sample manifold, said method comprising the steps of:

(a) at the beginning of each analysis cycle, said source of zero sample is conducted to said analyzer while the other sources are vented;



(b) at a predetermined time after analysis of said source of zero sample, conducting said reference source to said analyzer for calibration with the known amount of sample while the other sources are vented,

(c) sequentially activating the control valves so that one sample at a time passes the first and second control valves to be analyzed while all other sources are vented, and

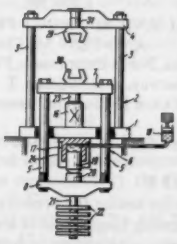
(d) after all sample sources have been analyzed, recycling the apparatus to begin said method again until stopped.

4,090,393

METHOD FOR THE CALIBRATION OR CHECKING OF DYNAMOMETERS AND APPARATUS EMBODYING SAME

Ivan Ivanovich Kharitonov, Khlebozavodskoi proezd, 8, korpus 2, kv. 149, and Artemy Stepanovich Bolshikh, Khlebozavodskoi proezd, 8, korpus 1, kv. 63, both of Moscow, U.S.S.R.

Filed Dec. 16, 1976, Ser. No. 751,528
Int. Cl.[2] G01L *25/00*
U.S. Cl. 73—1 B **3 Claims**



1. A method for the calibration or checking of dynamometers comprising the following operations: applying a force to the dynamometer being subjected to calibration or checking through a master dynamometer, said force being progressively changed in magnitude; retaining the force applied to said dynamometer being subjected to calibration or checking after each

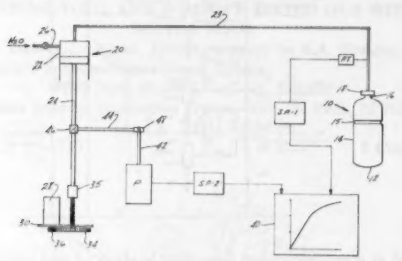
said application of a force; and simultaneously relieving said master dynamometer of said force applied.

4,090,394

PLASTIC BOTTLE TESTING

James N. Herman, and David M. Kaczorowski, both of Toledo, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Nov. 3, 1976, Ser. No. 738,516
Int. Cl.[2] G01M *3/02*
U.S. Cl. 73—37 **8 Claims**



1. A method for producing a stress-strain type curve for evaluating the functionality of a thermoplastic bottle comprising:

internally pressurizing a thermoplastic bottle with an incompressible fluid by relative movement of a piston and a cylinder,

sensing the pressure of said fluid and sensing the relative movement of said piston and cylinder as said bottle is being pressurized by such movement,

graphically recording said sensed pressure and said sensed relative movement as said bottle is being pressurized.

4,090,395

CASING SEAL AND BLOWOUT PREVENTER TESTER AND TEST METHOD

William P. Dixon, North Palm Beach, Fla.; Thomas C. Caldwell, Stavanger, Norway, and Willism T. Ilfrey, Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed Mar. 28, 1977, Ser. No. 782,108
Int. Cl.[2] G01M *3/28*
U.S. Cl. 73—40.5 R **16 Claims**

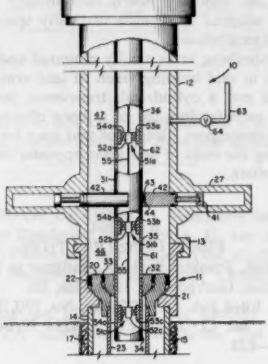
1. Apparatus for testing the pressure integrity of a blowout preventer and casing hanger seal of a wellhead comprising:

a tubular member which extends through said wellhead so as to provide an annular chamber between said blowout preventer and casing hanger when said blowout preventer is in a closed position;

means adapted to said tubular member for sealing off said casing hanger;

means for pressurizing said annular chamber; and

a plurality of pressure sensing means disposed along the length of said tubular member to simultaneously monitor the pressures above, below and within said annular chamber so that leakage across said blowout preventer and casing hanger can be readily detected.

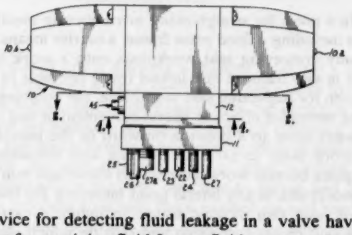


4,090,396

METHOD AND DEVICE FOR DETECTING HYDRAULIC LEAKS

John W. O'Brien, 607 S. Kelly St., Harrison, Ark. 72601

Filed Jan. 31, 1977, Ser. No. 763,899
Int. Cl.[2] G01M *3/28*
U.S. Cl. 73—46 **20 Claims**



1. A device for detecting fluid leakage in a valve having a supply port for receiving fluid from a fluid source, at least one load port for directing fluid to and from a load, a tank port for directing fluid to a reservoir, and a shiftable valve element for connecting and disconnecting selected valve ports to and from one another, said device comprising:

a housing adapted to be detachable coupled with the valve;

a first passage presented through said housing, said first passage providing communication between said fluid source and supply port when said housing is coupled with the valve;

a second passage presented through said housing, said second passage providing communication between said tank port and reservoir when said housing is coupled with the valve;

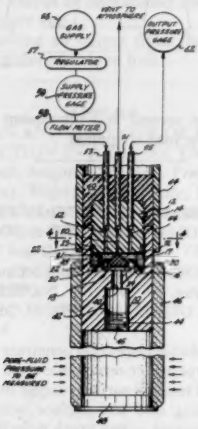
means on said housing for blocking said load port to prevent fluid from passing therethrough when said housing is coupled with the valve; and

detecting means associated with said housing for detecting fluid flowing into said second passage when said supply and load ports are connected with one another and said supply and tank ports are disconnected from one another.

4,090,397
PNEUMATIC TRANSDUCER FOR UNDERGROUND BURIAL

George A. Hancock, and Hugh W. McCutcheon, both of Seattle, Wash., assignors to Slope Indicator Co., Seattle, Wash.

Filed Jun. 27, 1977, Ser. No. 810,262
Int. Cl.[2] G01N *33/24*
U.S. Cl. 73—73 7 Claims



1. A pneumatic transducer for underground burial, comprising:

a valve body containing a cylindrical chamber;

a flexible, annular, imperforate diaphragm peripherally secured in fluid-tight manner within said chamber, said diaphragm spanning said chamber perpendicular to its longitudinal axis and defining thereby a pore-fluid pressure cavity and a separate contiguous transducer cavity;

a resilient hemispherical element axially located on said diaphragm within said transducer cavity;

a fluid pressure input duct means and a fluid pressure output duct means in said body, each of said duct means communicating with said transducer cavity in spaced-apart relation to each other and to the axis of said hemispherical element;

a third duct means in said body axial of said transducer chamber and in alignment with the apex of said hemispherical element, said third duct means forming a venting duct from said transducer cavity to the atmosphere, the cavity end of said venting duct being disposed in close proximity to the apex of said hemispherical element; and

means forming an inlet passage for liquid under pressure into the pore pressure cavity of said body.

4,090,398
METHOD FOR DETERMINING FLUID SATURATIONS IN RESERVOIRS

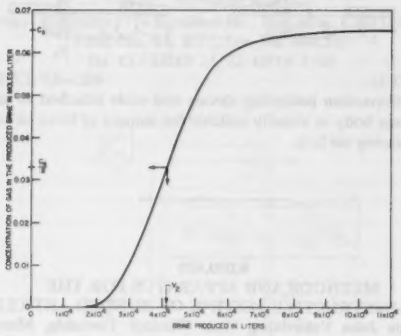
Harry A. Deans, and James R. Bragg, both of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Continuation-in-part of Ser. No. 647,223, Jan. 7, 1976, abandoned. This application Jan. 3, 1977, Ser. No. 756,150
Int. Cl.[2] E21B *43/22*
U.S. Cl. 73—19 17 Claims

1. A method for determining the relative amounts of two existing fluid phases in a portion of a subterranean reservoir formation having a known temperature and fluid pressure, wherein one of the phases is mobile and the other is essentially immobile comprising:

injecting into said formation by means of a well a measured volume of fluid which is unsaturated with said immobile fluid and which has limited solubility for said immobile fluid, selecting the amount of said injected fluid to create a liquid front with a first fluid volume before said front and a second fluid volume between said front and said well such that at least a measurable portion of said injected fluid within said formation remains unsaturated with said fluid of said immobile phase;

producing said injected fluid by means of said well in an amount sufficient to determine the volume of injected fluid substantially unsaturated with immobile fluid by



measuring the volume of said injected fluid substantially unsaturated with immobile liquid produced from the well as indicted by an appreciable increase in concentration of said immobile fluid in said mobile fluid which characterizes the location of said front, said front being characterized by a substantial increase in the amount of said immobile fluid in said injected fluid;

whereby said measured volume is taken as the unknown V_2 in the equation as follows:

$$S_{gr} = \frac{C_s}{C_g} \cdot \frac{V_1 - V_2}{V_2} \qquad \text{Equation 1}$$

Where

S_{gr} = residual gas saturation, fraction of reservoir pore volume;

C_s = the concentration of gas dissolved in the injected liquid when the injected liquid is saturated with the gas at reservoir conditions (moles/liter);

C_g = moles of residual gas per unit volume of residual gas at reservoir temperature and pressure (moles/liter);

V_1 = the total volume of liquid injected into the reservoir (liters);

V_2 = the volume of produced liquid which corresponds to the volume of injected liquid between the wellbore and the front where the gas concentration in the produced liquid changes from the original injected gas concentration to saturated gas concentration C_s (liters).

4,090,399
LOAD MEASURING GAGE

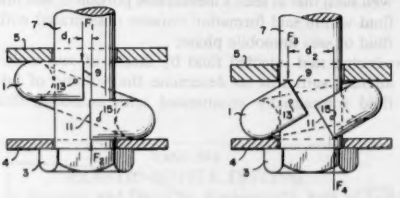
Clarence O. Babcock, Lakewood, Colo., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Jul. 31, 1974, Ser. No. 493,295
Int. Cl.[2] G01B *5/30*
U.S. Cl. 73—88 F 2 Claims

1. A combined load gage and indicating device comprising:

a deformable spiral ring gage body having two outer load bearing surfaces and a split ring section located along the length of the body adjacent said bearing surfaces and therebetween, said section comprising two opposing surfaces of the body each of which is oriented at an angle of

between 50 to 62 degrees with respect to its adjacent load bearing gage body surface; and



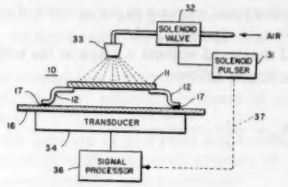
a deformation indicating device and scale attached to said gage body to visually indicate the amount of force on said bearing surface.

4,090,400

METHODS AND APPARATUS FOR THE NON-DESTRUCTIVE TESTING OF BONDED ARTICLES

Sotirios John Vahaviolos, West Windsor Township, Mercer County, N.J., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Apr. 18, 1977, Ser. No. 788,568
Int. Cl.[2] G01N *29/00*
U.S. Cl. 73—88 B **9 Claims**



1. A method for non-destructively measuring the strength of an adhesion bond between at least two articles wherein at least a portion of one of the bonded articles is normally spaced from the other article, comprising the steps of:

(a) applying a short duration burst of energy to the spaced portion of one of the bonded articles;

(b) detecting the stress wave emission signals emanating from the bonded articles subsequent to said energy burst; and

(c) comparing the detected stress wave emission signals with predetermined acceptable stress wave emission signals to determine the strength of the bond.

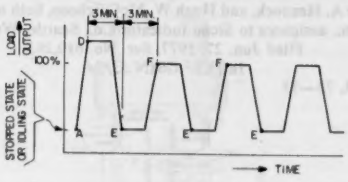
4,090,401

METHOD OF ENDURANCE TEST WITH INITIAL OVERLOADING

Shigeru Yamamoto, and Takashi Miwa, both of Nagasaki, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 18, 1977, Ser. No. 798,032
Claims priority, application Japan, May 18, 1976, 51-57146
Int. Cl.[2] G01M *15/00*
U.S. Cl. 73—91 **1 Claim**

1. A method of endurance test with initial overloading in which a load is repeatedly applied to a test member, characterized in that upon first one of said repeated loadings an overload



is applied but upon second and subsequent loadings a load smaller than the first load is applied.

4,090,402

SLOW-SOLUBILITY INSPECTION PENETRANT COMPOSITION CONTAINING A SOLUBILITY ACCELERATOR

James R. Alburger, 5007 Hillard Ave., La Canada, Calif. 91011

Filed Jun. 20, 1977, Ser. No. 808,136
Int. Cl.[2] G01N *21/16*; C09K *11/06, 3/00*
U.S. Cl. 73—104 **1 Claim**

1. In a water-washable inspection penetrant process in which a slow-solubility-type water-removable dyed liquid inspection penetrant is applied to a test surface, excess surface penetrant is removed by washing said test surface with water, leaving entrapments of penetrant in any crack defects which are present, and said test surface is inspected for the presence of flaw indications, the improvement wherein said slow-solubility-type penetrant consists essentially of the following formulation, stated in weight percentages:

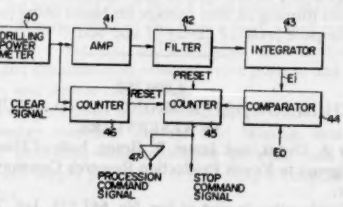
2,2,4-trimethyl-1,3-pentanediol-diisobutyrate — 94% to 5%
Diethylene glycol butyl ether acetate — 5% to 94%
C.I. Brightening Agent 68 — 0.7% to 3.64%
C.I. Solvent Yellow — 0.3% to 0.46%

4,090,403

APPARATUS FOR JUDGING THE USEFUL LIFE OF TOOLS

Tameyasu Tsukada, Tokyo, and Masaharu Terashima, Yokohama, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Continuation of Ser. No. 645,637, Dec. 31, 1975, abandoned.
This application Jul. 26, 1976, Ser. No. 708,715
Claims priority, application Japan, Nov. 21, 1975, 50-139989
Int. Cl.[2] G01N *19/00*
U.S. Cl. 73—104 **6 Claims**



1. An apparatus for judging the useful life of a tool comprising:

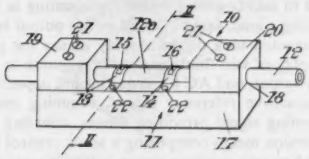
a detector for producing an electric signal corresponding to the working resistance of a workpiece, the detector having a tool power meter integrally provided on a workpiece table movable in the X and Y directions which are perpendicular to each other for producing the electric signal by using a sample made of the same material as the workpiece,

signal processing means for processing the electric signal,
a comparator for producing a pulse signal when the output signal from the processing means is different from a predetermined reference signal,
a first counter for counting the number of pulses from the comparator,
a second counter for counting a predetermined number of measurements of the working resistance performed by the detector, the output of said second counter being fed to said first counter and
means for obtaining an output from the first counter for judging the useful life of the tool.

4,090,404
APPARATUS AND METHODS OF DETECTING INJECTION IN A DIESEL ENGINE

Jean-Pierre Dupont, Soignolles-en-Brie, France; Jean-Francois Gregoire, Niamey, Niger; Michel Ligier, Paris, and Jacques Roy, Boulogne-Billancourt, both of France, assignors to Souriau & Cie, Boulogne-Billancourt, France

Filed Sep. 21, 1976, Ser. No. 725,279
Claims priority, application France, Sep. 23, 1975, 75 29170; Jul. 16, 1976, 76 21891
Int. Cl.² G01F *9/00*
U.S. Cl. 73—119 A **16 Claims**

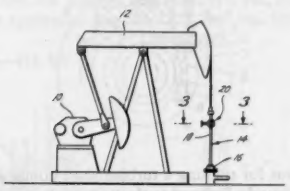


16. In a method of detecting the injection of fuel through tubing into an internal combustion engine in which the fuel injection is detected by detecting the transverse deformation of the tubing due to the pressure of the fuel injected through said tubing, the improvement wherein said deformation is detected at a portion of the tubing located between two spaced zones, the tubing being firmly clamped at said spaced zones by gripping means gripping around the periphery of the tubing and holding said tubing in fixed position independently of the detecting of said deformation.

4,090,405
POLISHED ROD LOAD TRANSDUCER

Fount E. McKee, Houston, Tex., assignor to Delta-X Corporation, Houston, Tex.

Filed Apr. 14, 1977, Ser. No. 787,675
Int. Cl.² G01L *1/22*
U.S. Cl. 73—151 **3 Claims**

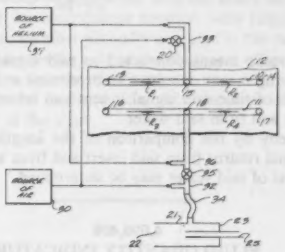


1. A polished rod load transducer for connection to the polished rod for measuring the load in a sucker rod well pumping system comprising,
a body having at least three symmetrical sections pivotally connected together,
releasable clamping means having a pivoting lever connected to said body for clamping the body about a polished rod,
a strain gauge mounted on each of the sections for measuring the strain of each section when the body is clamped on a polished rod,
an electrical circuit connected to all of said strain gauges for measuring the total output from all of the strain gauges.

4,090,406
SENSOR

Jerome A. Rodder, 774 Sunshine Dr., Los Altos, Calif. 94022

Filed Jun. 23, 1977, Ser. No. 809,303
Int. Cl.² G01B *13/12*; G01F *1/68*
U.S. Cl. 73—204 **12 Claims**



1. A sensor comprising:
a first elongated conduit having an inlet and an outlet;
a first resistive element having a resistance related to its temperature disposed in the first conduit in heat transfer relationship with fluid flowing therethrough;
a second elongated conduit having an inlet and an outlet;
a second resistive element having a resistance related to its temperature disposed in the second conduit in heat transfer relationship with fluid flowing therethrough;
a source of a first fluid;
a source of a second fluid having a different thermal conductivity than the first fluid;
first fluid mixing means interconnecting one or both of the sources to the inlet of the first conduit to supply a mixture of the first and second fluids in a fixed ratio between 0 and 100% of one of the fluids to the first conduit;
second fluid mixing means interconnecting the source of the first fluid to the inlet of the second conduit;
a T-network having a first arm connected to the source of the second fluid a second arm with an outlet exposed to a variable pressure, and a third arm connected to the second mixing means to supply to the second conduit a mixture of the first and second fluids in a variable ratio related to the variable pressure; and
means for sensing the difference in the resistance of the first and second resistive elements.

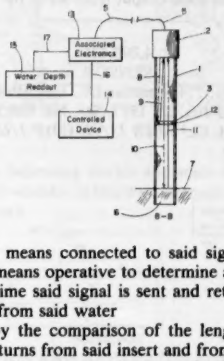
4,090,407
WATER LEVEL MEASUREMENT DEVICE

Cobia B. Shuler, North Charleston, and Wesley E. Moore, Jr., Summerville, both of S.C., assignors to T. W. Salisbury, III and Gayle F. Ellis, both of Charleston, S.C.

Filed Sep. 19, 1977, Ser. No. 834,690
Int. Cl.² G01F *23/00*
U.S. Cl. 73—290 V **10 Claims**

1. A device for measuring the level of water comprising:
a. a hollow, oblong structure with an open end, said structure being secured with said open end in said water;
b. signal sending and receiving means secured onto said hollow, oblong structure;
c. an insert, containing a hole, which is secured within said hollow, oblong structure and is operative to reflect a

signal from said signal sending and receiving means back to said signal sending and receiving means through said hollow, oblong strucuture and to allow portions of said signal to pass through said hole without being reflected by said insert and to be reflected by said water; and



d. electronic means connected to said signal sending and receiving means operative to determine and compare the length of time said signal is sent and returned from said insert and from said water

whereby by the comparison of the length of time said signal returns from said insert and from said water, the level of said water may be determined.

4,090,408

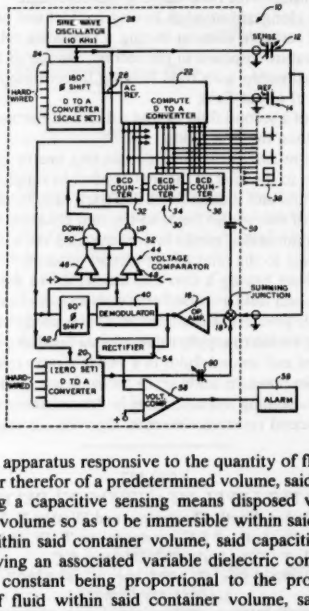
FLUID QUANTITY INDICATOR

Geoffrey S. Hedrick, Laurel Cir., Malvern, Pa. 19355

Filed Oct. 12, 1976, Ser. No. 731,229

Int. Cl.[2] G01F *23/26*

U.S. Cl. 73—304 C **15 Claims**



1. In an apparatus responsive to the quantity of fluid within a container therefor of a predetermined volume, said apparatus comprising a capacitive sensing means disposed within said container volume so as to be immersible within said fluid and any air within said container volume, said capacitive sensing means having an associated variable dielectric constant, said dielectric constant being proportional to the proportionate amount of fluid within said container volume, said sensing means capacitance varying in accordance with the variation in said porportionate amount of fluid; a reference capacitive means disposed within said container so as to normally be immersible within said fluid and responsive to variations in the dielectric constant of said fluid due to environmental conditions; the improvement comprising AC reference means operatively connected to said sensing means for providing a signal having a predetermined phase and frequency and voltage thereto, a current proportional to the capacitance of said sensing means flowing through said sensing means in response to said provided AC reference means signal; up/down counting means for providing an output signal indicative of said fluid quantity; first computing digital to analog conversion means having a magnitude input operatively connected in parallel to said counting means output for providing an output in response to said input, said conversion means output being operatively connected to said reference capacitive means for providing a voltage thereto, said output comprising a signal having a predetermined voltage and phase and opposite to said AC reference means signal phase and a predetermined frequency identical therewith; second digital to analog conversion means operatively connected to said first conversion means for providing a reference magnitude signal thereto, said reference magnitude signal providing a full scale set for said apparatus, said second conversion means being programmable to provide a universal apparatus full scale set compensation for containers for said fluid substantially independent of said container configuration for compensating for variations in full scale capacitance of a given container; differential amplifier summing means having an input operatively connected to said capacitive sensing means and said capacitive reference means output for summing the output signals provided therefrom; means operatively connected to said summing means output for providing a directional counting signal output in response to said summing means output, said counting signal output being operatively connected to said counting means for counting in response to said counting signal, said counting means output being operatively connected to a digital display means for providing a digital display of said fluid quantity in response to said counting means output; said AC reference means, capacitive sensing means, capacitive reference means, summing means, directional counting signal providing means, counting means and first conversion means comprising a servo control loop which is nulled when said counting means output is equivalent to said fluid quantity, said servo control loop varying said voltage applied to said capacitive reference means for nulling out the current flowing through said capacitive sensing means, whereby a container configuration independent real time digital display of fluid quantity within a given container which is capacitive leakage independent is provided.

4,090,409

APPARATUS FOR TURNING A TURBINE SHAFT

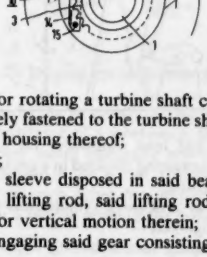
Bernd Ohleyer, Wesel, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Continuation of Ser. No. 637,404, Dec. 3, 1975, abandoned. This application May 12, 1977, Ser. No. 796,307

Claims priority, application Germany, Dec. 4, 1974, 2457354

Int. Cl.[2] F16H *27/02*

U.S. Cl. 74—128 **4 Claims**



1. Apparatus for rotating a turbine shaft comprising:

a. a gear securely fastened to the turbine shaft in the vicinity of a bearing housing thereof;

b. a lifting rod;

c. a stationary sleeve disposed in said bearing housing for guiding said lifting rod, said lifting rod disposed within said sleeve for vertical motion therein;

d. means for engaging said gear consisting of a rectangular

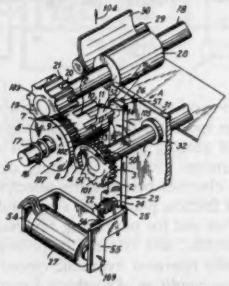
frame rotatably suspended from the bottom of said lifting rod, the bottom of said frame comprising a pin for engagement of said gear, said pin disposed so that it is normally located below the center of said shaft, whereby said pin will engage said gear only during upward motion of said lifting rod and said rectangular frame so that said rectangular frame and pin act in a pulling manner; and

e. drive means coupled to the upper end of said lifting rod for moving it upward to rotate said gear thereby rotating said machine shaft.

4,090,410
PAPER FEEDING MECHANISM

Osamu Nakamura, Shioji, Japan, assignor to Shinshu Seiki Kabushiki Kaisha, Japan

Filed Mar. 25, 1977, Ser. No. 781,397
Claims priority, application Japan, Apr. 12, 1976, 51-41037
Int. Cl.[2] F16H *1/06, 1/12, 55/04;* **B65H** *3/06*
U.S. Cl. 74—414 **18 Claims**

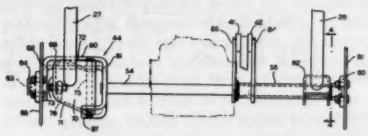


1. A paper-feeding mechanism for a compact printer comprising paper-feeding roller means, a driven wheel for transmitting rotary motion to said roller means, a driving wheel driving said driven wheel, said driven wheel having first and second rotary motion transmission means, said driving means having means for cooperative interengagement with said first and second transmission means, said first and second transmission means being adapted to drive said driven wheel at different rotary speeds when engaged by said interengagement means, and means for selectively engaging said interengagement means with one of said first and second transmission means for selecting the rotary drive speed of said driven wheel.

4,090,411
SKID-STEERED TRACTOR VEHICLE COMBINED STEERING LEVER AND AUXILIARY CONTROL WITH SELF-CENTERING MECHANISM

Larry E. Albright, Gwinner; James J. Bauer, Lisbon, and Earl W. Cramton, Gwinner, all of N. Dak., assignors to Clark Equipment Company, Buchanan, Mich.

Division of Ser. No. 635,559, Nov. 26, 1975, Pat. No. 4,043,416.
This application Sep. 20, 1976, Ser. No. 724,814
Int. Cl.[2] G05G *9/00*
U.S. Cl. 74—471 XY **2 Claims**

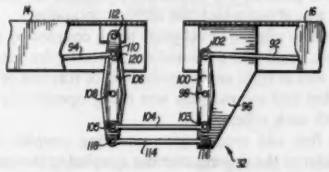


1. A dual control mechanism cooperable with first and second rotatable shafts operatively connected to respective first and second independent drive means, right and left steering levers connected to the respective first and second rotatable shafts, said dual control mechanism interposed at an outer end of a first rotatable shaft between said outer end and a lower end of one of the steering levers, the dual control mechanism enabling the steering lever to cooperatively engage one of said independent drive means while operating in a first plane and movable in a second plane perpendicular to the first plan for independently controlling a second device, said dual control mechanism comprising a rotatable carrier movable in a first direction, mounted at the outer end of the shaft for rotation therewith, the carrier comprising a member having opposite side walls, a first side wall including means providing a fixed connection between the carrier and the end of the shaft, a second side wall having a pivotal connection mutually aligned with the axis of the shaft and secureable to an outer wall of a vehicle for rotation of the carrier with the shaft, said steering lever mounted for independent rotation with respect to the carrier on a base member pivotally mounted in the carrier on a pin perpendicular to the axis of the shaft and offset from the steering lever so that the steering lever may be pivoted in a plane perpendicular to the plane of movement associated with the movement of the shaft.

4,090,412
HANDBRAKE LINKAGE FOR TRANSMITTING MECHANICAL BRAKING FORCE BETWEEN ADJACENT RAIL VEHICLES

Thomas H. Engle, Cape Vincent, N.Y., assignor to General Signal Corporation, Rochester, N.Y.

Filed Mar. 30, 1977, Ser. No. 783,038
Int. Cl.[2] G05G *1/04*
U.S. Cl. 74—519 **9 Claims**



1. A brake actuating linkage for use between adjacent rail cars, comprising:

a first link having first and second force transmission points, and a first fulcrum point;

a first pivot supporting said first link at said first fulcrum point at one end of one rail car;

a second link having third and fourth transmission points and a second fulcrum point;

a second pivot supporting said second link at said second fulcrum point at the opposing end of an adjacent rail car;

a third link interconnecting said second and third force transmission points;

means actuated by relative movement between the one rail car and the adjacent rail car for adjusting the position of said second pivot to maintain constant the positions of said first and fourth force transmission points as the adjacent rail cars undergo relative movement;

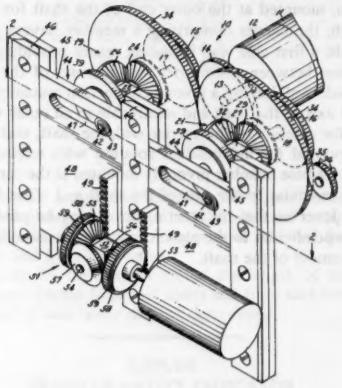
means for applying brake application force to said first force transmission point; and

means for transmitting brake application force from said fourth transmission point.

4,090,413
CYCLIC MOTION GENERATOR

Jack M. Vickland, Palo Alto, Calif., assignor to Ford Aerospace & Communications Corp., Dearborn, Mich.

Filed Oct. 29, 1976, Ser. No. 736,925
Int. Cl.[2] F16H *37/06*
U.S. Cl. 74—665 GB 5 Claims

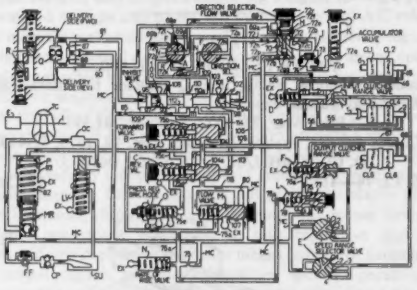


1. A cyclic motion generator comprising:
a motor means having an output shaft and a driving member coupled to the output shaft,
a plurality of differential means comprising a first, second and third differential gear set each having a plurality of gears journalled on a rotatable spider,
the gears of each of the gear sets including a pair of spaced bevel gears axially aligned on the spider for rotation about an axis about which the latter is rotatable,
the axially aligned bevel gears being coupled by an intermediate bevel gear mounted on the spider for rotation about an axis at right angles to the axis of rotation of the spider,
the first and second gear sets being operatively in parallel with each other,
each first and second gear set being coupled through its spider to the driving member coupled to the motor output shaft whereby the input members of the first and second gear sets are the spiders of the latter,
a pair of slide means,
crank means connecting respective ones of the first and second gear sets and the pair of slide means to each other,
the crank means being operative to translate rotary motion of a rotary member of each of the first and second gear sets into reciprocable slidable motion of the slidable means to which it is connected,
each of the slidable means having driving engagement with a separate driven member of the third gear set,
each of the driven members being coupled to a common output member of the third gear set,
and an adjustment means coupled to the operatively parallel gear sets for shifting the output phase relationship of one relative to the other to cause the pair of reciprocable slide means and thereby the two driven members of the third gear set to move in predetermined phased relationship relative to one another during each movement cycle of the cyclic generator,
the motion of the output member of the third gear set being a resultant of the movements of the two driven members of the latter.

4,090,414
TRANSMISSION CONTROL SYSTEM FOR SHUTTLE TYPE VEHICLES

Basil White, Rockford, Ill., assignor to Twin Disc, Incorporated, Racine, Wis.

Continuation-in-part of Ser. No. 676,923, Apr. 14, 1976, abandoned. This application Apr. 12, 1977, Ser. No. 786,880
Int. Cl.[2] F16H *47/00, 5/60;* F16D *25/00*
U.S. Cl. 74—733 9 Claims

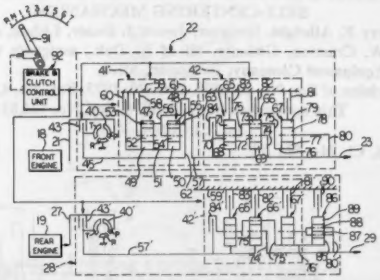


1. A shuttle type vehicle having a power transmission including change speed and direction gearing driven by a torque converter, said gearing including forward and reverse direction input clutches and also including output speed range clutches, said clutches being of the selectively and hydraulically actuated friction plate type, a hydraulic control system for said clutches and for permitting reversal of vehicle direction at full throttle, said system comprising: a pressure fluid source, manually operated hydraulic circuit means for selecting an operating condition of a vehicle direction and gear ratio, second hydraulic circuit means to effect deceleration and acceleration of the vehicle when a selection of opposite direction operating conditions is made, said second hydraulic circuit means including (a) means including an output driven fluid pump to sense speed and direction, (b) means to fully engage said direction clutches simultaneously, and (c) means to simultaneously partially engage a second clutch as a braking means.

4,090,415
VARIABLE-SPEED PLANETARY TRANSMISSION

James M. Gorrell, Morton; Terry R. Collins, Lewistown, and Willis E. Windish, Pekin, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Jul. 6, 1976, Ser. No. 702,547
Int. Cl.[2] B60K *41/18*
U.S. Cl. 74—769 28 Claims



1. In a transmission system;
a range unit having input and output shafts and a plurality of selectable speed ratios of torque transmission therethrough;

a hydrodynamic torque converter having a pump, a turbine, an input shaft connected to said pump and an output shaft connected to said turbine, one of said torque converter shafts being connected to one of said range unit shafts;

clutch means for selectively clutching said input and output shafts of said torque converter together for direct transmission of torque therebetween; and

control means for selecting any one of said speed ratios of said range unit and enabling actuation and deactuation of said torque converter clutch means during operation of said range unit in all of the various drive ratios.

4,090,416

GEAR BOXES

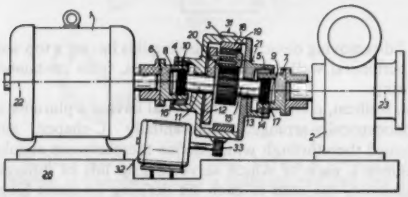
Raymond John Hicks, Llanwrthwl, Wales, assignor to Vickers Limited, London, England

Filed Aug. 27, 1975, Ser. No. 608,220

Claims priority, application United Kingdom, Sep. 4, 1974, 38739/74

Int. Cl.² F16H *3/44, 1/28*

U.S. Cl. 74—785 **13 Claims**



1. A gear box serving as a transmission coupling between nominally co-axial driving and driven shafts, the gear box comprising a casing, bearings mounting the casing with respect to said shafts, an epicyclic gear train within the casing, and flexible couplings that are disposed within the casing about the centers of said bearings and that couple said gear train to said driving and driven shafts, each flexible coupling comprising a crowned tooth gear meshed with an internally toothed gear having straight cut teeth, the annulus gear of the epicyclic gear train and said casing being fast with one another and able to rotate, and a prime mover being provided that is coupled to said casing for rotating said casing and said annulus gear at a desired speed and direction; or for preventing such rotation.

4,090,417

CONTROL SYSTEM FOR AN AUTOMATIC TRANSMISSION WITH A HYDROKINETIC TORQUE CONVERTER AND AN INTEGRAL LOCKUP CLUTCH

Lawrence D. Burcz, and Douglas A. Whitney, both of Livonia, Mich., assignors to Ford Motor Company, Dearborn, Mich.

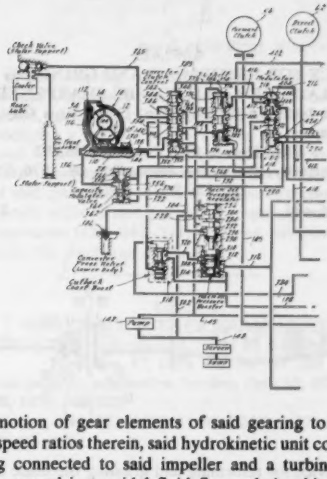
Filed Jan. 7, 1976, Ser. No. 647,037

Int. Cl.² B60K *41/22;* **F16H** *45/02, 47/00;* **F16D** *33/10*

U.S. Cl. 74—864 **14 Claims**

1. A hydrokinetic power transmission mechanism having a hydrokinetic unit with an impeller and a turbine, the impeller being connected driveably to an engine, multiple ratio gearing, an output gear element of said gearing being connected to a driven member, clutch and brake means for controlling the relative motion of gear elements of said gearing to establish multiple speed ratios therein, said hydrokinetic unit comprising a housing connected to said impeller and a turbine in said housing arranged in toroidal fluid flow relationship with respect to said impeller and adapted to be connected to an input element of said gearing, lockup clutch means in said housing for connecting driveably said turbine to said housing thereby establishing a direct-driving connection between said turbine and said engine, a source of control pressure, control circuit means for establishing fluid distribution from said control pressure source to said clutch and brake means, said control circuit means including a pressure regulator valve adapted to establish a hydrokinetic unit charge pressure in a first portion of said control circuit means and clutch-and-brake means actuating pressure in another portion of said control circuit means, said lockup clutch means comprising a pressure actuated friction member cooperating with said housing to define a pressure zone containing pressure that develops a force opposing application of said lockup clutch means, said friction member being exposed to the charge pressure in said hydrokinetic unit whereby clutch actuating forces are applied to said clutch member, said pressure zone being in fluid communication with said first portion of said control circuit means, the hydrokinetic unit being in fluid communication with said first portion of said control circuit means, a flow return passage communicating with said hydrokinetic unit and extending to low fluid pressure regions, and hydrokinetic unit lockup clutch valve means in both of said portions of said control circuit means for supplying pressure directly from said other portion to said hydrokinetic unit and for modulating the pressure in said pressure zone to effect a pressure unbalance across said friction member causing the lockup clutch means to be engaged.

7. A hydrokinetic power transmission mechanism having a hydrokinetic unit with an impeller and a turbine, the impeller being connected driveably to an engine, multiple ratio gearing, an output gear element of said gearing being connected to a driven member, clutch and brake means for controlling the



relative motion of gear elements of said gearing to establish multiple speed ratios therein, said hydrokinetic unit comprising a housing connected to said impeller and a turbine in said housing arranged in toroidal fluid flow relationship with respect to said impeller and adapted to be connected to an input element of said gearing, lockup clutch means in said housing for connecting driveably said turbine to said housing thereby establishing a direct-driving connection between said turbine and said engine, a source of control pressure, control circuit means for establishing fluid distribution from said control pressure source to said clutch and brake means, said control circuit means including a pressure regulator valve adapted to establish a hydrokinetic unit charge pressure in a first portion of said control circuit means and clutch-and-brake means actuating pressure in another portion of said control circuit means, said lockup clutch means comprising a pressure actuated friction member cooperating with said housing to define a pressure zone containing pressure that develops a force opposing application of said lockup clutch means, said friction member being exposed to the charge pressure in said hydrokinetic unit whereby clutch actuating forces are applied to said clutch member, said pressure zone being in fluid communication with said first portion of said control circuit means, the hydrokinetic unit being in fluid communication with said first portion of said control circuit means, a flow return passage communicating

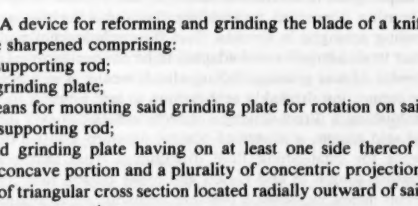
with said hydrokinetic unit and extending to low fluid pressure regions, hydrokinetic unit lockup clutch valve means in both of said portions of said control circuit means for supplying pressure directly from said other portion to said hydrokinetic unit and for modulating the pressure in said pressure zone to effect a pressure unbalance across said friction member causing the latter to be engaged, an engine torque signal valve means for establishing a pressure signal that is related in magnitude to engine torque, a speed signal source for developing a speed pressure signal related in magnitude to the driven speed of said driven member, said speed signal acting on said lockup clutch valve means for triggering movement thereof to a clutch engaged position upon an increase in the ratio of the speed signal pressure signal to the torque signal pressure signal, said pressure regulator valve being in fluid communication with said torque signal valve means whereby auxiliary pressure forces act on said pressure regulator valve means to increase the output regulated pressure level thereof upon an increase in engine torque, said capacity modulator valve communicating with the pressure outlet side of said pressure regulator valve to cause a clutch capacity increase for said clutch member upon an increase in engine torque.

4,090,418

DEVICE FOR REFORMING AND GRINDING THE BLADE OF A KNIFE TO BE SHARPENED

Shigeyoshi Ishida, 6-10, Dojojuku, Utsunomiya City, Tochigi Pref., Japan

Filed Dec. 2, 1976, Ser. No. 746,692
Claims priority, application Japan, Feb. 28, 1976, 51-23878
Int. Cl.[2] B21K *11/02*
U.S. Cl. 76—84 **11 Claims**



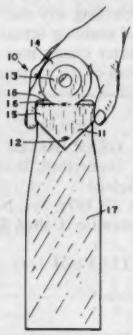
1. A device for reforming and grinding the blade of a knife to be sharpened comprising:
- a supporting rod;
- a grinding plate;
- means for mounting said grinding plate for rotation on said supporting rod;
- said grinding plate having on at least one side thereof a concave portion and a plurality of concentric projections of triangular cross section located radially outward of said concave portion;
- at least one guide disk;
- means for mounting said guide disk for rotation on said supporting rod adjacent said one side of said grinding plate;
- said guide disk having on the side thereof facing said grinding plate an outer circumferential surface inclined toward said grinding plate;
- means between said grinding plate and said guide disk to maintain an axial clearance space between said guide disk and said plurality of concentric projections;
- and means on said supporting rod for preventing axial displacement of said grinding plate and said guide disk.

4,090,419

HAND GRIP FOR REMOVING SCREWTOP LIDS

Garnett Abraham, 215 Manor Rd., Staten Island, N.Y. 10314

Filed Mar. 29, 1977, Ser. No. 782,591
Int. Cl.[2] B67B *7/00*
U.S. Cl. 81—3.4 **4 Claims**



1. A lid-removing device for removing lids having a top wall and a peripheral wall depending therefrom, from containers, comprising:

a flat, resilient, elastic sheet of material having a plurality of concentrically-arranged, substantially C-shaped slits formed therethrough which define therebetween annular segments, each of which serve to grip lids of different diameters, the ends of each slit defining an unslit hinge portion therebetween which integrally joins adjacent annular segments to one another, said hinge portions permitting pivoting of said annular segments relative to one another so that one of said annular elements may be pivoted downwardly to encircle the periphery of a container lid in flat, abutting and non-skid engagement with the lateral peripheral wall thereof while the annular segments disposed inwardly of said engaged annular element are pivotably upwardly such that they are disposed normal to the top wall of said lid; and

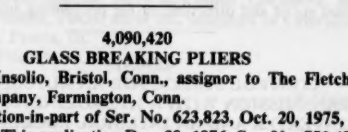
a tab integrally coupled to, and projecting outwardly from and in the same plane as, the outermost annular segment of said sheet of material.

4,090,420

GLASS BREAKING PLIERS

Thomas A. Insolio, Bristol, Conn., assignor to The Fletcher-Terry Company, Farmington, Conn.

Continuation-in-part of Ser. No. 623,823, Oct. 20, 1975, abandoned. This application Dec. 20, 1976, Ser. No. 752,474
Int. Cl.[2] B25B *7/00*
U.S. Cl. 81—5.1 A **10 Claims**



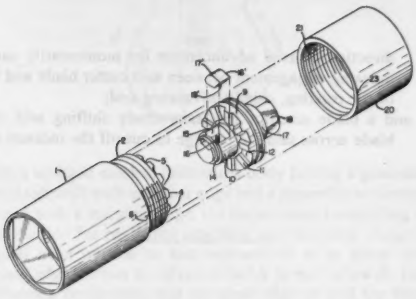
1. Glass breaking pliers comprising plier elements having jaw portions and handle portions, means pivotally connecting intermediate portions of said plier elements to one another so that squeezing said handle portions causes said jaw portions to grip a glass sheet therebetween, each plier element handle portion being fabricated from a resilient material having a modulus of elasticity such that said handle portions will bend toward one another as the manually applied squeezing force is increased, said handle portions having abutment means on the

outer ends adapted to abut one another when said force reaches a predetermined limit whereby the crushing force of the jaws on the glass is correspondingly limited.

4,090,421
SPARK PLUG TIGHTENER

Nordfried Czeczerski, Freinsheimer Strasse 88, 6711 Frankenthal-Flomersheim, Germany

Filed Dec. 15, 1976, Ser. No. 750,820
Claims priority, application Germany, Jun. 24, 1976, 7620041
Int. Cl.[2] B25B *23/14*
U.S. Cl. 81—52.4 R **2 Claims**



1. In a spark plug tightener having a cylindrical housing having at one end thereof a multi-faceted opening and at the other end thereof an annularly formed shape in front view profile with an engaging configuration on the top, a turning shaft with corresponding front views and configuration on the bottom for engaging said configuration on top of said housing and held under pressure from cup springs by a cover screwed over the housing, the improvement, wherein said engaging configuration on the top of said housing and bottom of said shaft comprises radially oriented trapezoidal elevations and depressions with steeply sloping sides provided on said housing and shaft, cup springs carried on said shaft adjacent the cover providing pressure between the engaging configurations on the housing and shaft, inner teeth provided on said housing, and a ratchet arranged in said shaft and extending through said housing and engaging said teeth for raising the reverse torque.

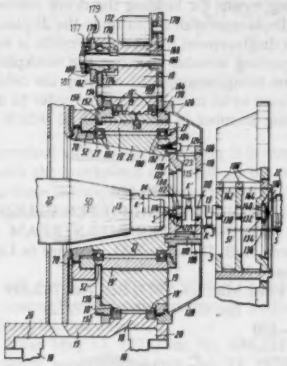
4,090,422
TOOL MACHINE FOR MACHINING CRANK SHAFTS

Hermann Berbalk, Goppingen, Germany, assignor to Gebruder Boehringer Gesellschaft mit beschrankter Haftung, Germany

Filed Nov. 12, 1976, Ser. No. 741,519
Claims priority, application Germany, Nov. 14, 1975, 2551250
Int. Cl.[2] B23B *1/00, 5/18*
U.S. Cl. 82—1 C **6 Claims**

5. A method of machining a section of a crankshaft by means of an annular tool having internal cutting teeth comprising the steps of mounting said crankshaft in stationary condition, slipping said tool over said crankshaft from one end thereof into a position in which it surrounds said section, imparting rotation to said tool about its own axis, imparting a plunge feed motion to said tool in a direction transversely to said crankshaft, stopping said plunge feed motion when said cutting teeth have taken a roughing cut from one side of said crankshaft section, imparting an orbiting motion to said annular tool in which the axis thereof performs a circular path about the axis of said crankshaft section to advance the roughing cut circumferentially around said crankshaft section, continuing said orbiting motion after said tool axis has travelled at least once around the axis of said workshaft section while increasing the distance of said axes by an amount corresponding to the depth of a finishing cut and again causing said tool to orbit about said crank shaft section substantially once to take a circumferential finishing cut from said crankshaft section.

6. A machine tool for machining a crankshaft comprising a bed, stationary work holding means on said bed for supporting a crankshaft at its ends and at a point between said ends, a pair of rotary annular tools having internal cutting edges, at least one of said tools being formed by a bushing having an internal diameter sufficient for the accomodation within the bushing of a crank pin and of the adjoining crank arms and by a plurality of axially spaced circular sets of cutting inserts mounted on the

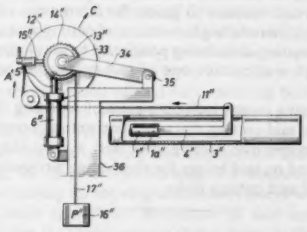


inside of said bushing for simultaneously machining at least two co-axially disposed crank shaft pins, a pair of tool holders on said bed, each tool holder including one of said tools, means for producing a relative rotary cutting motion between said tools and said crankshaft, whereby said tools are capable of simultaneously engaging and machining a plurality of coaxial pins of said crankshaft, of which at least two pins are located on opposite sides of said points, said bushing being provided with apertures (**124, 142, 144**) between said sets of cutting inserts for the discharge of chips.

4,090,423
WORKPIECE FEEDER ARRANGEMENT

Bard Meyer Waage, Rosenlund, S-741 00 Knivsta, Sweden

Filed Jun. 17, 1976, Ser. No. 697,235
Claims priority, application Sweden, Jun. 18, 1975, 7507000; Jan. 20, 1976, 7600522
Int. Cl.[2] B23B *13/00;* B23Q *5/22*
U.S. Cl. 82—2.5 **4 Claims**



1. A feeder arrangement for intermittently feeding forward a workpiece for machining in a machine tool comprising, in combination:

(a) a guide member in which the workpiece is carried during its intermittent movement toward a stationary, releasable clamping member of the machine tool;

(b) a supporting member displaceably arranged in the guide member for moving the workpiece forward;

(c) a lever arm mounted for pivotal movement, one end of

the lever arm being pivotally journalled to a stationary stand;

(d) a rotatable drum including a shaft therethrough supported at an end of the shaft by the other end of the lever arm;

(e) linkage means including a cable connected at an end thereof to the supporting member and wound at the other end thereof about the rotatable drum;

(f) a feeder device for pivotally displacing the drum supported on the lever arm between an initial position and a displaced position; and

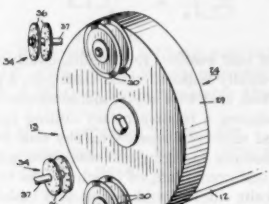
(g) arresting means for holding the drum rotationally fixed during displacement of the drum to the displaced position, wherein displacement of the drum results in movement of the supporting member to move the workpiece forward, said drum being rotatable to wind up the cable on return of the drum to its initial position in order to maintain the supporting member in the position to which it has been moved.

4,090,424

APPARATUS FOR CUTTING FILTER PLUGS FROM A MOVING FILTER ROD STREAM

Floyd Vanmeda Hall, Durham, N.C., assignor to Liggett Group Inc., Durham, N.C.

Filed Mar. 29, 1977, Ser. No. 782,399
Int. Cl.[2] B26D *1/26, 7/12*
U.S. Cl. 83—330 **1 Claim**



1. In an apparatus for making filter rods, the combination comprising

means for delivering a continuous rod of entrainment-type filter material in a predetermined path; and

a knife assembly in said path for severing discrete plugs from said rod, said knife assembly including a ledger having a plurality of recesses therein and guide tubes extending across said recesses to guide the continuous rod of filter material therethrough, two sets of cutting disks, each said set of cutting disks being positioned to simultaneously pass through a respective one of said recesses of said ledger; and

a sharpening means including pairs of whetting disks in the path of said cutting disks for sharpening opposite sides of each respective cutting disk and a cone-shaped block mounted on said ledger for sharpening a respective side of two of said cutting disks.

4,090,425

WIRE COILING MACHINE FLUID CUTOFF

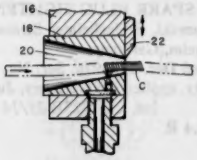
Stephen A. Platt, Grand Haven, Mich., assignor to S. A. Platt, Inc., Grand Haven, Mich.

Filed Apr. 1, 1977, Ser. No. 783,945
Int. Cl.[2] B26D *7/06;* B21F *11/00*
U.S. Cl. 83—402 **10 Claims**

1. A coil cutoff apparatus for severing an axially advancing, rotationally moving wire coil, comprising:

a cutter assembly including a transversely shiftable cutter blade and a coil-restraining die cooperative with said cutter blade, said die having a passage for advancement of a wire coil therethrough, and said cutter blade having an indexing position protruding chordally of said passage;

fluid bias means operable on said wire coil transverse to its



direction of axial advancement for momentarily causing indexing engagement between said cutter blade and turns of the rotating, axially-advancing coil;

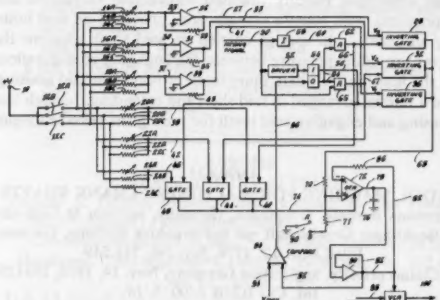
and a blade actuator for transversely shifting said cutter blade across said die passage to cut off the indexed coil.

4,090,426

CONTOUR GENERATOR FOR AUDIO SIGNAL

David A. Luce, Clarence Center, N.Y., assignor to Norlin Music, Inc., Lincolnwood, Ill.

Filed Jun. 20, 1975, Ser. No. 588,689
Int. Cl.[2] G10H *1/02*
U.S. Cl. 84—1.26 **12 Claims**



1. A circuit for providing a predetermined contour for the audio signal produced by an electronic musical instrument comprising:

means for providing a reference potential of a predetermined value;

means for providing a unidirectional reference current of a predetermined value;

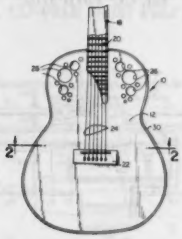
means for increasing or decreasing the amplitude of said audio signal from its existing level to a level determined by said reference potential, the change occurring at a rate determined by said reference current, the direction of said reference current being the same regardless of whether said amplitude is increasing or decreasing; and

means operative when it is desired to increase or decrease the amplitude of said audio signal for making an appropriate change in the value of said reference potential.

4,090,427
STRINGED MUSICAL INSTRUMENT BODY

Charles H. Kaman, Prattling Pond Rd., Farmington, Conn. 06032

Filed Jun. 23, 1976, Ser. No. 698,955
Int. Cl.[2] G10D *1/08*
U.S. Cl. 84—291 5 Claims



1. In a stringed musical instrument body having a generally vertical sidewall with an upper edge and a generally horizontal top plate with a marginal edge, the improvement consisting of a construction for resiliently attaching said top plate along its marginal edge portion to said sidewall so as to allow said marginal edge portion to vibrate relative to said sidewall, said construction comprising said marginal edge of said top plate being horizontally space along its length a substantial distance inboard of said upper edge of said sidewall, and a mounting member extending along the length of said upper side wall edge and said marginal top plate edge, said mounting member having an outboard longitudinal edge portion fixed to the upper edge portion of said sidewall, an inboard longitudinal edge portion fixed to said marginal portion of said top plate, and an intermediate portion extending substantially from said upper edge of said sidewall to said marginal edge of said top plate, said intermediate portion being resiliently flexible so as to permit said marginal edge portion of said top plate to vibrate vertically relative to said sidewall through accompanying bending of said intermediate portion of said mounting member, said marginal edge portion of said top plate being spaced vertically above said upper edge of said sidewall, and said intermediate portion of said mounting member in a vertical section perpendicular to its longitudinal axis curving upwardly from said upper edge of said sidewall and inwardly to said marginal edge of said top plate.

4,090,428
APPARATUS FOR DRIVING THE GENERATING OR ROLLING CRADLE OF A GEAR-CUTTING MACHINE

Erich Kotthaus, Wallisellen, and Otto Hildinger, Schwerzenbach, both of Switzerland, assignors to Werkzeugmaschinenfabrik Oerlikon-Buhrle, Zurich, Switzerland

Filed Mar. 8, 1976, Ser. No. 664,924
Claims priority, application Switzerland, Mar. 27, 1975, 3959/75
Int. Cl.[2] B23F *9/10*
U.S. Cl. 90—6 5 Claims

1. A method of cutting gears, especially bevel gears having a plurality of tooth slots from a workpiece, comprising the steps of:

rotatably supporting a workpiece;

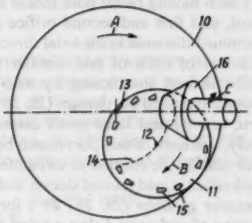
rotatably supporting a cutter head on a rolling cradle for rotation about a cutter head axis;

placing the cutter head into engagement with the workpiece while producing a generating roll movement of the rolling cradle;

rotating the cutter head at a substantially constant cutting speed;

rotating the workpiece at a substantially constant rotational speed while maintaining the cutter engaged with the workpiece; and

continually increasing the speed of the generating roll movement of the cradle from a given starting value up to a

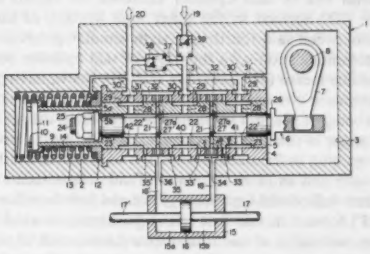


given terminal value while the cutter is in cutting engagement with the workpiece such that all the tooth slots of the gear from the workpiece are completely cut at the end of said generating roll movement.

4,090,429
FAIL-SAFE FLUID CONTROL VALVE

Toshio Kamimura, Fuwa, Japan, assignor to Teijin Seiki Company Limited, Osaka, Japan

Filed May 12, 1976, Ser. No. 686,222
Claims priority, application Japan, Jul. 21, 1975, 50-89027
Int. Cl.[2] F15B *13/04*
U.S. Cl. 91—466 3 Claims



1. An improved combination of a valve cylinder and a fail-safe fluid control valve, employing a control valve, said control valve including: a valve housing (1) having first and second concave portions (2, 3) formed therein, a first sleeve (4) positioned within and fixed to said first concave portion of said housing, a reciprocably movable second sleeve (5) provided in said first sleeve, a reciprocably movable valve spool (6) provided in said second sleeve, an input lever (7) provided in said second concave portion of said valve housing being pivotally connected to an end portion of said valve spool for axially reciprocating said valve spool and said second sleeve upon jamming of said valve spool and said second sleeve, resilient means (13, 14) disposed within said first concave portion of said valve housing for moving said second sleeve at a predetermined position against the movement of said input lever, a valve cylinder (15), said valve cylinder being in fluid communication with said first concave portion of said valve housing, an inlet conduit (19) arranged in said valve housing for supplying pressurized oil to said first concave portion of said valve housing, an outlet conduit (20) disposed in said valve housing for discharging said oil from said first concave portion of said valve housing, a pair of cylinder conduits (18, 18') connecting said first concave portion of said valve housing and said valve cylinder, for supplying said pressurized oil to said valve cylinder and discharging said oil from said valve cylinder, the improvement comprising:

a pair of annular flange members (21, 21') formed on said valve spool forming first, second and third small diameter portions (22, 22', 22'') at predetermined distances therebetween in an axial direction;

said second sleeve including first and second orifice means (27, 27') each having radial bore means in circumferential alignment, said first and second orifice means being at a predetermined distance in the axial direction substantially equal to that of each of said annular flanges, being in opposition thereto for closing by said annular flanges; first, second and third port means (28, 28', 28'') opposed to said first, second and third small diameter portions, respectively, and each of said port means being defined by at least one radial bore formed in circumferential alignment with each other in said second sleeve; and first, second and third annular grooves (29, 29', 29'') formed in an outer wall portion of said second sleeve being in fluid communication with said first, second and third of port means, respectively;

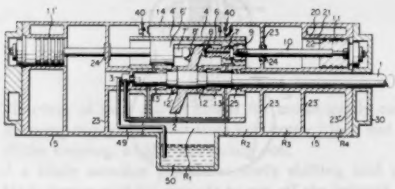
said first sleeve including fourth, fifth and sixth port means (30, 30', 30'') opposing said first, second and third annular grooves, respectively, of said second sleeve and each port means defined by at least one radial bore means in circumferential alignment in said first sleeve, fourth, fifth and sixth annular grooves (31, 31', 31'') in the outer wall portion of said first sleeve being in fluid communication with said fourth, fifth and sixth port means, said fourth annular groove being in fluid communication with said inlet conduit, and said fifth and sixth annular grooves being in fluid communication with bifurcated ends of said outlet conduit; a seventh annular groove (32) formed in the outer wall portion of said first sleeve between said fourth and fifth annular grooves and in fluid communication with one of said cylinder conduits; an eighth annular groove (32') formed in the outer wall portion of said first sleeve between said fourth and sixth annular grooves and in fluid communication with the other of said cylinder conduits; fifth orifice means (34) formed in said first sleeve having radial bore means in circumferential alignment and each of said bore means being of a length substantially three times that of each of said flanges in the axial direction, each bore means having an outer opening in fluid communication with said seventh annular groove and an inner opening in fluid communication with the inner wall of said first sleeve; third and fourth orifice means (33, 33') formed in said first sleeve positioned in axial spaced relation with sides of said fifth orifice means, each of said fifth orifice means having radial bore means in circumferential alignment and each bore means having a length substantially equal to that of each of said flanges in the axial direction, said third and fourth orifice means of said bores having respective outer opening in fluid communication wtih said seventh annular groove and respective inner openings closed by an outer wall of said second sleeve upon said fifth orifice means coinciding with said first orifice means in the axial direction; an eighth orifice means (36) formed in said first sleeve and having radial bore means in circumferential alignment, each bore means having a length substantially equal to three times that of each of said flanges, each bore means having an outer opening in fluid communication with said eighth annular groove and an inner opening in fluid communication with said second orifice means upon said fifth orifice means axially coinciding with said first orifice means; sixth and seventh orifice means (35, 35') formed in said first sleeve being positionable in axially spaced relation with sides of said eighth orifice means and each sixth and seventh orifice means having radial bore means in circumferential alignment and each bore means having a length substantially equal to that of each of said flanges in the axial direction, said sixth and seventh orifice means of said bore means having respective outer openings in fluid communication with said eighth annular groove and respective inner openings closed by the outer wall of said second sleeve upon said fifth orifice means being axially coincidental with said first orifice means.

4,090,430

SWASH PLATE TYPE COMPRESSOR

Shiro Matsumoto; Jiro Shishido, and Toshitsugu Fukumoto, all of Hiroshima, Japan, assignors to The Japan Steel Works, Tokyo, Japan

Continuation of Ser. No. 579,445, May 21, 1975, abandoned. This application Nov. 22, 1976, Ser. No. 743,979
Claims priority, application Japan, Oct. 9, 1974, 49-115478
Int. Cl.[2] F01B 3/02
U.S. Cl. 92—71 **1 Claim**



1. A swash plate type gas compressor comprising a housing enclosing swash plate means drivingly connected to a driving shaft, means for introducing gas into said housing, a plurality of cylindrical guide blocks mounted within cylindrical longitudinally extending frame means and each including first guide cylinders disposed in a circle around said driving shaft, cylindrical guide members each shiftably contained in each of said first cylinders and drivingly connected to said swash plate so as to perform a reciprocating movement with the rotation of said driving shaft, two sets of second cylinders disposed around said driving shaft, each set having substantially the same diameter and disposed, respectively, on opposite sides of said first cylinders, each said set of second cylinders corresponding in number to and axially spaced approximately the same distance from said first cylinders whereby the center lines of each said first and second sets of cylinders coincide, two sets of piston means, each set of piston means having substantially the same diameter and contained respectively in each of said sets of second cylinders for reciprocation, said sets of piston means each provided with a plurality of piston rings of a meterial having self-lubricating characteristics, two sets of piston rod means, each set of piston rod means connecting respective confronting pairs of said cylinder guide means and one set of said piston means, a first compartment formed by part of said frame means and a first transverse partition wall within which is located said first cylinders and said cylindrical guide members and further including channel means for lubrication of said first cylinders, said cylindrical guide members and said driving shaft, lubricant supply means located in said first compartment to forcibly supply lubricant through said channel means to said first cylinders, said cylindrical guide members and said driving shafts, a second compartment located adjacent said first compartment and formed by an extending part of said frame means and separated therefrom by said first partition wall through which said piston rod means passes, a second partition wall fixedly held in said second compartment to divide the same into two parts comprising a first part coextensive with said first partition wall and a second part located remote from said first partition all and having one set of said second cylinders and piston means mounted therein in tight engagement therewith, first lubricating seal means located in said first compartment surrounding said driving shaft to prevent compressed gas and lubricant from said compartments from leaking to the atmosphere, and second lubricating seal means spaced from said drive shaft and located in said first partition wall surrounding each set of said piston rod means to prevent lubricant in said first compartment from entering said second compartment, said first seal means, second seal means and said plurality of pistons rings preventing lubricant in said first compartment from entering said second compartment and gas in the second part of said second compartment from entering said first com-

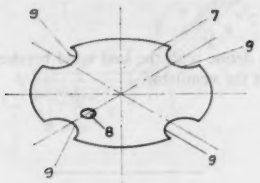
partment, said first compartment and said first part of said second compartment being maintained at an identical pressure.

4,090,431

BLADDER FOR FORCE TRANSMISSION APPARATUS

Georg Hirmann, Zurich, Switzerland, assignor to Rudolf Felix Homberger, Schaffhausen, Switzerland

Filed Mar. 10, 1976, Ser. No. 665,719
Int. Cl.² F01B *19/00*; F16J *3/02*
U.S. Cl. 92—92 **2 Claims**



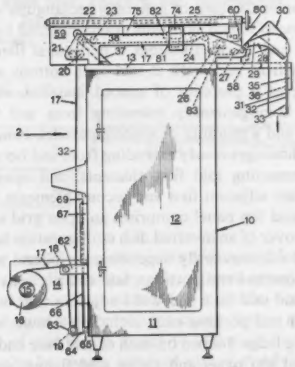
1. An inflatable bladder adaptable for use in a pressure responsive force transmission apparatus, said bladder comprising in combination, a pair of flat flexible sheets having a planar surface and disposed one atop another, one of said sheets having an opening in the planar surface for admission to and discharge from between said sheets of an inflating pressure fluid, said pair of flat flexible sheets being joined together about a common peripheral edge, the peripheral edge defining a circular configuration having at least four uniformly disposed substantially identical indentations positioned concave relative to the center of the bladder, said concave indentations providing buffer sections which take up an excess length of the periphery accumulating at the outside diameter of the bladder on inflation.

4,090,432

GUIDING AN ELONGATE SHEET OF PACKAGING MATERIAL

Jack Hobart, Leamington Spa, England, assignor to Hobart Engineering Limited, England

Filed Feb. 9, 1977, Ser. No. 767,115
Int. Cl.² B65H *25/26*
U.S. Cl. 93—20 **16 Claims**



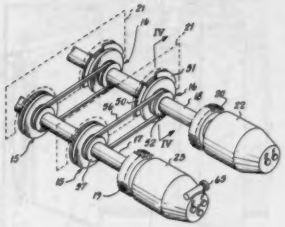
1. A method of guiding an elongate sheet of packaging material towards a former which manipulates the sheet into a tube having its longitudinal edges slighly overlapped to enable them to be formed into a seam, including intentionally causing the sheet to drift sideways in one direction as it is drawn towards the former, detecting when one longitudinal edge of the sheet has drifted to a first predetermined position then causing the sheet to drift sideways in the opposite direction until the said one longitudinal edge of the sheet has drifted to a second predetermined position and then intentionally causing the sheet to drift sideways again in the said one direction.

4,090,433

PRODUCTION OF CARTON BLANKS

Robert William Jardine, Bramhall, and Frederick Paul Johnson, Audenshaw, both of England, assignors to Simon Container Machinery Limited, Stockport, England

Filed Dec. 20, 1976, Ser. No. 752,525
Claims priority, application United Kingdom, Jan. 15, 1976, 1533/76
Int. Cl.² B31B *1/22*
U.S. Cl. 93—58.2 R **9 Claims**



1. Creasing and slotting apparatus for producing carton blanks from a moving sheet of material, comprising a first driven shaft carrying at least one rotary creasing head having a formation adapted continuously to engage said moving sheet to crease same, a second driven shaft carrying at least one rotary slotting head aligned, in the direction of travel of said sheet, with said creasing head and having a pair of circumferentially spaced apart arcuate slotting blades adapted to cut said sheet, one of said blades being movable relative to the other around the axis of said shaft such that the distance between the blades, and thus the slots cut thereby, is adjustable, first compensator means for selectively rotating said second shaft and thus said slotting head while the shaft is stationary or in motion, to enable the head to be positioned in register relative to said moving sheet, and second compensator means for selectively rotating said first shaft in likewise manner, there being a driving connection between said first shaft and the movable slotting blade on said second shaft, whereby the relative positions of said fixed and movable blades can be adjusted during drive.

4,090,434

VARIABLE INDUCTION APPARATUS WITH A PRIMARY FLUID FLOW CONTROLLED INDUCTION DAMPER

Michael L. Krisko, Danbury, and Donald R. Pare, Forestville, both of Conn., assignors to Connor Engineering & Manufacturing, Inc., Danbury, Conn.

Filed Mar. 7, 1977, Ser. No. 774,776
Int. Cl.² F24F *11/02*
U.S. Cl. 98—38 E **19 Claims**

1. An induction apparatus for a compressible fluid such as air as used in an air conditioning system and for mixing, by induced flow, primary fluid which may be conditioned with secondary fluid which may be unconditioned, comprising a housing having walls defining a compressible fluid inlet chamber and a separate compressible fluid outlet chamber and having a partition means between said chambers,

said housing including means to connect said inlet chamber to a source of conditioned fluid and said housing also

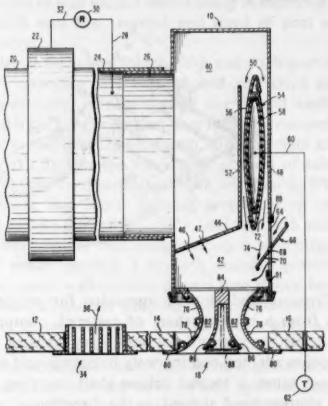
including an outlet to release fluid from said outlet chamber,

said partition means including at least one constricted nozzle orifice for admitting compressible fluid from said inlet chamber to said outlet chamber, said partition means also including a variable flow fluid inlet positioned to one side of said nozzle orifice and adjacent to one outside wall of said housing,

controllable means associated with said variable flow inlet for controllably varying the flow of primary fluid therethrough from said inlet chamber to said outlet chamber,

an induction port opening in said wall of said housing in the portion thereof defining said outlet chamber,

said induction port opening being arranged for communication with a source of secondary fluid,



a damper valve element mounted within said induction port for closing said port and pivotally mounted to swing about an axis substantially perpendicular to the flow of fluid through said variable flow inlet,

means for constantly biasing said induction port damper towards the open position, the pivotal mounting of said induction port damper being positioned so that the opening rotation of said induction port damper swings the downstream end of said damper into said outlet chamber of said housing and into the path of fluid from said variable flow inlet so that the flow of fluid from said variable flow inlet tends to close said damper,

the opening and closing of said damper thus being controllable by the flow of fluid passing through said variable flow inlet to thereby control the volume of induced secondary fluid flow.

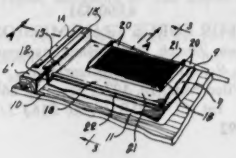
4,090,435

VENTILATORS

Louis Léonce Vallée, 6392 Maubourg Ave., Montreal, Quebec, Canada (H1M 2C8)

Filed Feb. 18, 1977, Ser. No. 769,884
Foreign Application Priority Data Mar. 18, 1976 Canada 248407
Int. Cl.[2] F24F *7/02*
U.S. Cl. 98—42 A **8 Claims**

1. A roof ridge ventilator for sheet metal roofing wherein the sheet metal roofing has a cut out ventilator opening and a screen is fitted into the ventilator opening, the said ventilator having a pair of opposing side walls spaced outwardly of adjacent side edges of the cut out ventilator opening in the roof, a pair of wind breakers spaced downwardly of the adjacent end edges of the cut out ventilator opening in the roof and extending between the opposing side walls of the ventilator, and a cover member secured to the said opposing side walls of the ventilator and extending downwardly beyond the said wind breakers, the downward edges of the said cover member adjacent to the said wind breakers being bent downwardly and



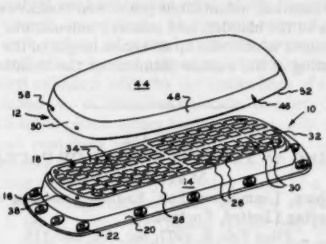
outwardly to define with the said wind breakers openings to the interior of the ventilator.

4,090,436

NONMETALLIC VENT WITH INTEGRAL SCREEN

Gordon C. Wright, Charlotte, Mich., assignor to MW Industries, Inc., Charlotte, Mich.

Filed Mar. 24, 1977, Ser. No. 780,582
Int. Cl.[2] F23L *17/02*
U.S. Cl. 98—66 R **3 Claims**



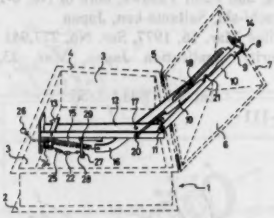
1. A nonmetallic vent comprising, in combination, an elongated nonmetallic base of generally rectangular configuration having spaced lateral sidewalls interconnected by end walls, a top panel and an open bottom, a peripheral flange extending outwardly from said walls at said open bottom, said top panel consisting of a plurality of spaced, parallel, elongated first elements homogeneously extending from and between said sidewalls and a plurality of spaced, parallel, elongated second elements homogeneously extending from and between said end walls intersecting said first elements, and openings defined intermediate adjacent first and second elements, respectively, wherein said top panel comprises an open grid screen, a nonmetallic cover of an inverted dish configuration having a cover panel and a downwardly depending peripheral wall including side portions and end portions, said end portions closely overlapping said said base end walls adjacent said base top panel, said cover end portions each including a lower edge, a cover supporting ledge defined on each of said base end walls spaced below said top panel and above said flange, said cover end portions lower edges each engaging one of said ledges, fasteners interconnecting said overlapping end portions and end walls mounting said cover on said base with said cover panel in spaced relation to said top panel, said cover side portions being spaced apart a greater distance than said base side walls and overlying said sidewalls and top panel venting said top panel screen.

4,090,437

OPENING-DEVICES FOR SMOKE- AND HEAT-VENTS

Pierre Emmanuel Eugéne Jean Bogaert, 18, Dijk, Wemmel, Belgium

Filed Jul. 16, 1976, Ser. No. 705,878
Claims priority, application Belgium, Jul. 18, 1975, 831558
Int. Cl.[2] F23L *17/02*
U.S. Cl. 98—86 10 Claims



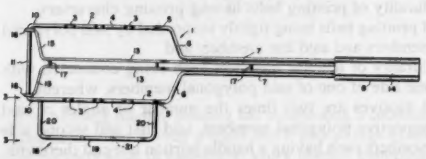
1. In a smoke and heat vent having a first, fixed frame mounted to a roof opening, a second, pivoting frame pivotally mounted on said fixed frame, a device for opening said vent, said device comprising at least one fixed arm extending transversally inside said fixed frame and fastened at both ends to said fixed frame, at least one pivoting arm pivotally mounted at one of its ends on said fixed arm, means for attaching the other end said pivoting arm to said second frame, said means comprising a connecting member slidably mounted on said pivoting arm, a pivoting hook mounted on said fixed arm and adapted to hook said pivoting arm in closed position of said pivoting frame, means for unlocking said pivoting hook, means for producing a force for opening said pivoting frame, and means for absorbing said opening force at the end of its opening stroke, said opening force having its support on the fixed arm only and being transmitted to the end of the pivoting arm by said connecting member to the second, pivoting frame, said device forming a complete unit such that all stresses created by said force are contained within said device while said vent is kept free of said stresses.

4,090,438

FRYING UTENSIL

Miguel L. Luna, 3580 Mack Rd., Bridgeport, Mich. 48722

Filed Mar. 19, 1976, Ser. No. 668,464
Int. Cl.[2] A47J *43/18;* A23P *1/00*
U.S. Cl. 99—441 4 Claims



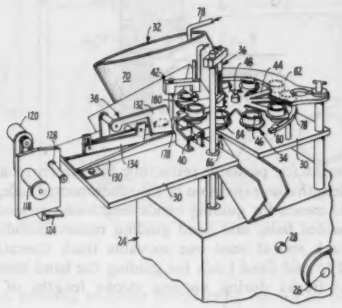
1. A frying utensil comprising a rack formed of a number of substantially parallel, side-by-side, spaced apart members shaped at corresponding intervals to provide a plurality of open top and open end receptacles; clamp means; means hinging one end of said clamp means to said rack to enable said clamp means to be swung into and out of overlying relation with said rack; and a U-shaped retainer structure comprising a plurality of parallel, coplanar filamentary webs, each of which terminates at its opposite ends in parallel legs spaced apart by said webs, said legs of each of said webs being joined to one of said members at one side of said rack, each of said webs extending the length of said rack but being spaced by its legs from one end of each of said receptacles, whereby said webs form a barrier at said one end of each of said receptacles when said utensil is tilted to a position in which said webs are lowermost.

4,090,439

COMBINATION PITTER AND STUFFER FOR OLIVES

Harold J. Chall, Hayward, and Frederick J. Cimperman, Castro Valley, both of Calif., assignors to Vistan Corporation, San Leandro, Calif.

Continuation of Ser. No. 586,888, Jun. 16, 1975, abandoned.
This application Mar. 10, 1977, Ser. No. 776,108
Int. Cl.[2] A23N *4/08*
U.S. Cl. 99—494 2 Claims



1. A pitting and stuffing machine for olives comprising a horizontally disposed turntable and a drive mechanism for intermittently rotating the turntable, said turntable comprising a plurality of horizontally and radially extending vertically flexible arms laterally isolated from each other, an open-ended olive support cup carried by each of said arms, an olive feed mechanism to supply an olive to each cup, a pitting mechanism to which each of said cups is successively moved, means responsive to the movement therepast of said arms to flexibly deflect said arms and thereby impart limited vertical vibratory movement to said arms and consequent vertical orientation to the olives in the cups as said cups travel between said feed mechanism and said pitting mechanism, said pitting mechanism comprising an upper pitting and a lower coring knife pair and means to move them together into engagement with a pit and then together downwardly in a pit and core removing operation, a stuffing mechanism to which each of said cups is successively moved after having been presented to said pitting mechanism, said stuffing mechanism comprising means defining a stuffing-piece positioning chamber, an upper, olive hold-down member, and a lower, upwardly movable plunger operable to move said stuffing-piece upwardly to stuff an olive engaged by said hold-down member, and cooperative means to simultaneously operate said pitting mechanism in association with one of said arms and said stuffing mechanism in association with an adjacent arm without the transmittal between said one arm and said adjacent arm of interfering forces, said cooperative means including the flexibility of said arms and their lateral isolation from each other.

4,090,440

APPARATUS FOR RECOMPACTING FIBROUS MATERIALS

Kenneth B. Jensen, P.O. Box 163, Ellensburg, Wash. 98292

Filed Jan. 31, 1977, Ser. No. 764,038
Int. Cl.[2] B65B *13/04*
U.S. Cl. 100—4 5 Claims

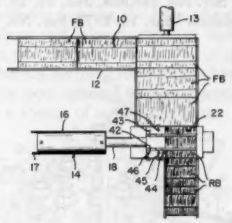
1. A device for recompacting bales of resilient fibrous crop material such as hay, comprising:

a recompaction chamber having top, bottom and end walls,

a platen slidably positioned in said chamber, means for reciprocating said platen,

entry means for introducing compressed bales of fibrous crop material into said chamber,

discharge means for discharging recompacted bales from said chamber, banding means for automatically placing bands around said recompacted bale in planes lying generally parallel to the longitudinal axis of compressive movement of said platen,



control means for partially retracting the platen to allow partial lengthwise expansion of the recompacted bale, and

band guide means for guiding bands lengthwise around the recompacted bale, said band guiding means including a fixed track and at least one movable track operatively coupled to said fixed track for guiding the band between the two tracks during varying stroke lengths of said platen.

4,090,441

APPARATUS FOR STACKING AND BALING NEWSPAPERS OR THE LIKE

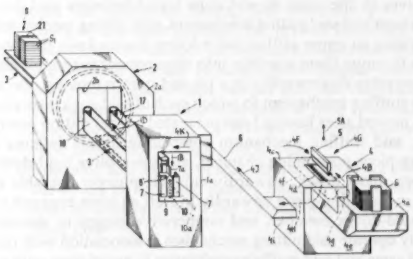
Hans Müller, Zofingen, Switzerland, assignor to Grapha-Holding AG, Hergiswil, Switzerland

Filed Jan. 21, 1977, Ser. No. 761,500

Claims priority, application Switzerland, Jan. 27, 1976, 979/76

Int. Cl.[2] B65B *13/10, 13/18*

U.S. Cl. 100—7 **10 Claims**



1. Apparatus for baling sheets, particularly folded newspapers or the like, comprising a support; means for conveying a succession of sheets onto said support, one above the other, so that the sheets pile up and form a growing stack; a transfer device operable to move fully grown stacks off said support in a predetermined direction; transporting means extending in said direction and defining an elongated path for grown stacks, said transporting means comprising a first guide device disposed below said path and contacting a first side of a grown stack thereon, a second guide device having two lateral guide members flanking said path and contacting two additional sides of a grown stack thereon, and means for driving said devices at the same speed to thereby advance grown stacks along said path by transmitting motion to said one side and to said additional sides of a grown stack in said path; a retractible stop extending across said path to arrest an oncoming grown stack in a predetermined position in which the trailing end of such stack is disposed between said lateral guide members and a circumferentially complete portion of the arrested stack remains unobstructed; and means for looping a cord or the like around the unobstructed portion of the arrested stack to thus convert the latter into a bale.

4,090,442

HAND STAMP

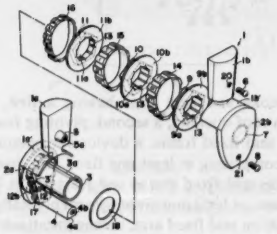
Toshio Yazawa, and Fumi Yazawa, both of No. 6-11-15, Motogou, Kawaguchi-shi, Saitama-ken, Japan

Filed Mar. 16, 1977, Ser. No. 777,941

Claims priority, application Japan, Mar. 23, 1976, 51-34679[U]

Int. Cl.[2] B41J *1/60*

U.S. Cl. 101—111 **2 Claims**



1. A hand stamp comprising:

a first side member;

a second side member;

a bar member releasably connected with an end of said first and second side members;

said bar member having a flat bottom surface along the entire length thereof,

a cylindrical shaft releasably connected with said first and second side members;

said shaft having a single protrusion on the outer surface thereof,

said protrusion extending along the entire length of said shaft and having a triangular shape in cross-section,

said protrusion being formed integral with said shaft,

a plurality of polygonal members each having a through-hole at the center thereof for inserting said shaft therethrough and a plurality of grooves having a triangular shape corresponding to said protrusion in cross-section at spaced intervals on the circumferential surface of said through-hole, thereby releasably engaging said shaft with said polygonal members;

a plurality of printing belts having printing characters;

said printing belts being tightly suspended by said polygonal members and said bar member, and

a plurality of annular members each being connected with one side of one of said polygonal members, wherein

said grooves are two times the number of angles of said respective polygonal members, said first and second side members each having a handle portion integral therewith, said handle portions being releasably connected together to form a handle of said stamp.

4,090,443

DRIVEN SQUEEGEE CARRIAGE AND MAGNETIC BEAM BACKUP

Manfred Gasser, Klagenfurt, Austria, assignor to Johannes Zimmer, Klagenfurt, Germany

Filed Sep. 24, 1976, Ser. No. 726,257

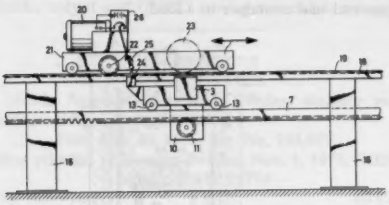
Claims priority, application Germany, Oct. 2, 1975, 7531294; Austria, Oct. 3, 1975, 7591/75

Int. Cl.[2] B41F *15/46*

U.S. Cl. 101—123 **3 Claims**

1. An apparatus for screen type-printing of webs (5) com-

prising: a print blanket (4) carrying a web (5) to be treated; a magnetic beam (3) disposed below said web (5); first rail means (7) rollably supporting said magnetic beam (3) in a longitudinal direction of said print blanket (4); first motor means (10) for moving said magnetic beam (3), said first motor means (10) having at least one drive wheel (11) engageable with said first rail means (7); said magnetic beam (3) being provided with a supporting surface for said blanket (4), said surface being disposed beneath said blanket (4) and a magnetic squeegee means



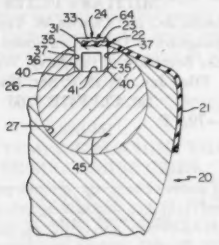
(2); said magnetic squeegee means (2) being mounted in a working carriage (21) above said web (5) and being attractable to said magnetic beam (3); said working carriage (21) being rollably supported in the longitudinal direction of said print blanket (4) by second rail means (18), said working carriage having second motor means (20) for rollable movement on said second rails (18); and contactless sensor means operable in response to deviation in the longitudinal position of said working carriage from said magnetic beam to thereby control the speed of one of said motor means.

4,090,444

PRINTING BLANKET HOLDING BAR

Joseph E. Stearns, Dayton, Ohio, assignor to Dayco Corporation, Dayton, Ohio

Filed Mar. 16, 1977, Ser. No. 778,298
Int. Cl.[2] B41F *27/06*
U.S. Cl. 101—415.1 **17 Claims**



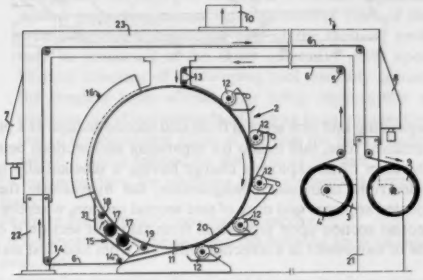
1. A printing blanket holding bar comprising a substantially U-shaped member having a bight and a pair of legs extending from opposite ends of said bight, and a blanket clamping arm being adapted to cooperate with said bight to fix an associated end portion of a printing blanket therebetween, said legs having cooperating planar surfaces which are adapted to engage cooperating surfaces of a bar support to quickly attack and detach said holding bar relative to said bar support, said cooperating planar surfaces comprising a pair of planar inside surfaces which face toward each other and a pair of planar outside surfaces which face away from each other, each of said pair of surfaces being adapted to be selectively employed and brought into engagement with said cooperating surfaces of said bar support to enable attachment and detachment of said holding bar relative thereto, each of said pair of surfaces when selectively employed defining the sole means for holding said bar on said bar support.

4,090,445

FABRIC PRINTING MACHINE WITH IMPRESSION CYLINDER WASHING

Enzo Sassi, Sesto San Giovanni (Milan), Italy, assignor to Crompton & Knowles Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 522,969, Nov. 11, 1974, abandoned. This application Nov. 10, 1976, Ser. No. 740,647
Claims priority, application Italy, Aug. 9, 1974, 26193 A/74
Int. Cl.[2] B41F *35/00*
U.S. Cl. 101—425 **8 Claims**



1. A printing machine for printing fabrics or other porous materials comprising:

(a) a fixed supporting structure;

(b) a rotating cylindrical drum supported by said structure, said drum having a horizontal axis of rotation, the periphery of said drum having a descending half and an ascending half;

(c) a coating of rubber material attached to said drum periphery;

(d) upper and lower guide rollers for guiding an advancing web into and out of contact with said rubber coating on the descending half of the drum over an arc which is not greater than 180° and which excludes the lowermost point of said drum periphery;

(e) a plurality of printing rollers supported by said structure for printing said web at spaced points while it is in contact with said coating of periphery;

(f) means disposed along the ascending half of said drum periphery coating for washing and coating said ascending half with a liquid;

(g) at least one barrier member supported by said fixed structure and located between said washing means and the lowermost point of said drum for engaging said coating of rubber material and preventing washing liquid from descending along said coating toward said lowermost point;

(h) at least one squeegee member supported by fixed structure and located above said washing means on the ascending half of said periphery drum for engaging said coating and preventing said rubber coating from having a film of cleaning liquid after it ascends from said squeegee member; and

(i) a receptacle located beneath said squeegee member, said washing means and said barrier member for collecting washing liquid therefrom.

4,090,446

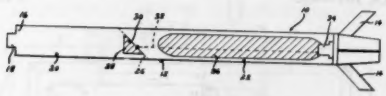
CONTROLLED DEPTH OF BURIAL PENETRATOR

Thomas A. Tomasetti, Taylor, Pa., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 2, 1977, Ser. No. 765,028
Int. Cl.[2] F42B *25/00*
U.S. Cl. 102—7.2 **7 Claims**

1. A controlled depth of burial penetrator comprising an elongated body of streamlined configuration, said body being

made up of a first and second section, said second section having a nose thereon, said nose being of a wedge-shaped configuration defining an angle of substantially 45° with respect to a line located along the longitudinal axis of said penetrator, said sections being fixedly secured together whereby an end of said first section matingly engages said nose of said second section, and means located within said first section for



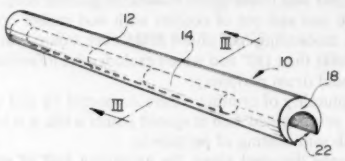
separating said first section from said second section at a predetermined time, said means for separating said sections being in the form of an explosive charge having a substantially isoseceles right triangular configuration, the hypotenuse thereof located adjacent said nose of said second section, whereby said second section upon separation from said first section is capable of movement in a direction different from said first section.

4,090,447

DIRECTIONAL BLASTING TUBES AND METHOD OF USE

Oscar A. Johnsen, R.R. #1, Site 4, Box 27, Sparwood, British Columbia, Canada

Continuation of Ser. No. 569,404, Apr. 18, 1975, abandoned. This application Jan. 11, 1977, Ser. No. 758,551
Claims priority, application Canada, Feb. 26, 1975, 220848
Int. Cl.[2] F42D *1/02*
U.S. Cl. 102—23 **23 Claims**



1. A method of blasting material comprising the steps of inserting into a bore hole a means for directing the blast of an explosive charge in the material to be blasted, said means being an elongated, substantially rigid tube having a cresent-shaped exterior cross-section and an explosive charge extending therealong, said rigid tube having an air space therein extending substantially the length thereof, said air space being cresent-shaped in cross-section and being oriented in said hole between said explosive charge and one side of said bore hole in a direction relative to said explosive charge opposite that in which the maximum breaking and shattering forces are desired to be directed, and, while said means is still in said bore hole, detonating said explosive charge.

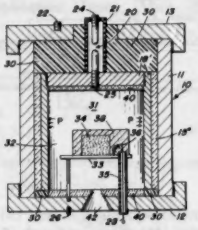
4,090,448

FERROELECTRIC PULSED POWER SOURCE

Millard F. Rose, Dahlgren, and John A. Mazzie, Fredericksburg, both of Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 29, 1971, Ser. No. 213,760
Int. Cl.[2] F42B *5/08*
U.S. Cl. 102—70.2 GA **2 Claims**

1. A high power pulse generator comprising:
a cylindrical container;
a cylindrical piezoelectric crystal disposed within said container and having the exterior surface thereof in electrical contact with the interior surface of said container;
a hollow cylindrical electrode disposed within said crystal in electrical contact therewith and insulated from said container;
spark gap means disposed in and closing one end of said container, said spark gap means being insulated from said container and having one side thereof electrically connected to said cylindrical electrode;
means for electrically connecting the other side of said spark gap and said container to a load;



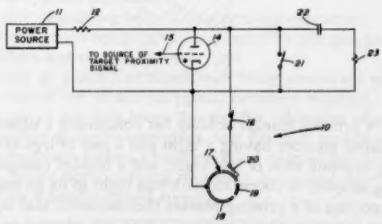
an end cap secured to the other end of said container, and insulated from said cylindrical electrode, to define a pressure chamber within said hollow cylindrical electrode; and
combustible means for rapidly generating a pressure of predetermined magnitude and duration within said pressure chamber whereby radially acting forces will suddenly compress said piezoelectric crystal between said cylindrical electrode and said container to create a potential difference across said spark gap and a resulting high power pulse when the breakdown voltage is reached.

4,090,449

METHOD FOR SYNCHRONIZING POINT DETONATING ARMING WITH CONTROLLED VARIABLE TIME DETONATING ARMING IN MILITARY FUZES

Stephen Stoltman, Jr., and Charles W. Tepper, both of Rochester, N.Y., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 19, 1970, Ser. No. 8,160
Int. Cl.[2] F42B *9/08*
U.S. Cl. 102—70.2 P **10 Claims**



1. In a projectile fuze, a PD and CVTD arming circuit comprising:
a power source; and
an electronic switch connected to and primed by said power source, responsive to a target proximity signal to change its state; and
a CVTD arming switch connected to said electronic switch and said power source so that said power source and said electronic switch are ineffectual until said CVTD arming switch is actuated; and

a PD or CVTD mode selection means connected to said CVTD arming switch so as to determine the mode of operation of the fuze; and

an electric primer in series with a firing capacitor connected to said power source; and

a PD switch connected to said CVTD arming switch and said electronic switch and said electric primer so that actuation of said PD switch will cause detonation of the electric primer only if said mode selection means is in the PD mode, or, if said mode selection means is in the CVTD mode, only if said CVTD arming switch has actuated.

4,090,450

SAFETY DEVICE

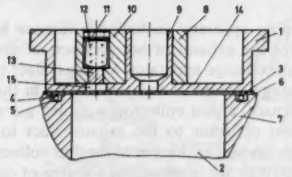
Olof Martin Nygards, Karlskoga, Sweden, assignor to Aktiebolaget Bofors, Bofors, Sweden

Filed Oct. 20, 1976, Ser. No. 733,987

Claims priority, application Sweden, Nov. 1, 1975, 7412494

Int. Cl.² F42C *15/34*

U.S. Cl. 102—76 P **10 Claims**



1. An improved safety device for the initiating device of a projectile, rocket or the like, said projectile being of the type having a space for a charge, said space being closed at one end by a safety plate; a priming charge; and movable member means arranged on the opposite side of said plate from said charge for movement from a safety position in which said priming charge is separated from said safety plate by at least said movable member means to an armed position in which hot gases from said priming charge can pass through said movable member and safety plate to ignite said charge, said safety device further comprising a punch member means mounted for acceleration by gas pressure generated upon ignition of said priming charge for piercing said safety plate to allow said hot gases to reach and ignite said charge.

4,090,451

MOBILE TRACK TAMPING MACHINE THAT TAMPS THREE SUCCESSIVE CRIBS

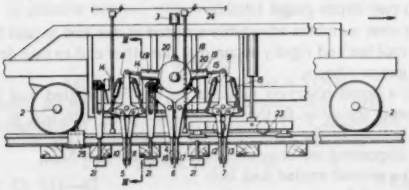
Josef Theurer, Vienna, Austria, assignor to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H., Vienna, Austria

Filed Jan. 26, 1976, Ser. No. 652,476

Claims priority, application Austria, Feb. 27, 1975, 1537/75

Int. Cl.² E01B *27/16*

U.S. Cl. 104—12 **8 Claims**



1. A mobile track tamping machine for substantially simultaneously tamping ballast underneath successive track ties resting on the ballast, the ties having elongated edges extending transversely of the track and two ends extending in the direction of the track, the elongated edges of adjacent ones of the ties defining cribs therebetween, which comprises

(a) machine frame;

(b) a carrier mounted on the machine frame;

(c) a tamping tool assembly mounted on the carrier and including as sole means for tamping ballast from the cribs under the ties

(1) three pairs of vibratory tamping tools spaced from each other in the direction of the track, the spacing being such that each pair of tools is in vertical alignment with a respective one of three successive ones of the cribs whereby a respective pair of the tamping tools may be immersed in the three successive cribs upon vertical lowering of the tamping tool assembly carrier, the tamping tools of each pair being reciprocable in opposite directions towards and away from a respective one of the elongated edges of the ties, the ballast under which is being tamped by the tools of the pair

(d) a common drive for vibrating the three pairs of tamping tools,

(e) a drive for vertically moving the carrier,

(f) drive means for reciprocating the tamping tools of each pair, and

(g) means for mounting the pairs of tamping tools on either side of an intermediate one of the pairs of tamping tools movably in the direction of the track in relation to the intermediate pair of tamping tools.

4,090,452

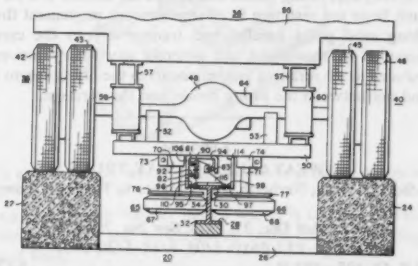
POWER RAIL, CONTROL SIGNAL RAIL AND GUIDE BEAM ARRANGEMENT FOR A TRANSPORTING SYSTEM

William R. Segar, Monroeville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 11, 1975, Ser. No. 639,955

Int. Cl.² B61F *9/00*

U.S. Cl. 104—247 **12 Claims**



1. For transportation system having at least one vehicle, a plurality of wheel and axle assemblies for carrying each vehicle, power and signal collectors mounted on each vehicle, a roadway for each vehicle to traverse, and a top flanged guide beam associated with said roadway for directing each vehicle along said roadway, the apparatus comprising:

at least one power rail associated with said roadway for providing electromotive energy to said vehicle;

at least one signal rail associated with said roadway for providing control signals to said vehicle;

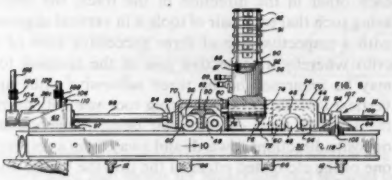
means for mounting said power rail and said signal rail to the top flange of said guide beam, with said mounting means being positioned above said top flange to improve vertical and lateral alignment of said power and signal rails with said collectors, and to permit modular assembly of said power rail and said signal rail with said guide beam.

4,090,453

RERAILING SYSTEM

Syed Y. Ali, Chicago, and Anthony G. Profet, Wheeling, both of Ill., assignors to Templeton, Kenly & Company, Broadview, Ill.

Filed Aug. 16, 1976, Ser. No. 714,580
Int. Cl.[2] B61K *13/00*
U.S. Cl. 104—273 14 Claims



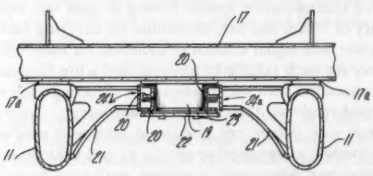
1. In a rerailing system for pivotally moving one end of a derailed vehicle through a large arc about an opposed vehicle end the combination comprising a support surface; a carriage axially movable along said support surface; parallel support rollers mounted for ready rotation on said carriage; upper peripheral surface portions of said rollers lying in substantially the same plane in the normal course of system use; means connected to said carriage for controlled axial movement of said carriage along said support surface, and lifting means for supportably engaging a derailed railway vehicle; said lifting means being mounted on said support rollers for movement thereover transversely to the direction of carriage movement; said rollers defining a path for said lifting means along which such transverse movement of said lifting means is effected; the frictional resistance afforded by said support rollers to movement of said lifting means thereover being such that force components imparted by a supported derailed car moving said lifting means over said rollers along an axis transversely to said direction of carriage movement effect movement of said lifting means over said rollers, simultaneously as said carriage means moves axially along said direction of carriage movement, whereby said lifting means and supported vehicle end traverse such large arc resulting from simultaneous movement thereof along axial paths parallel and transversely to the carriage direction of movement and wherein any rotary movement induced in the rerailing system occurs in the lifting means itself and not between the lifting means and the carriage.

4,090,454

WEAVABLE RAILWAY TRUCK

Albert G. Dean, Narberth, Pa., assignor to The Budd Company, Troy, Mich.

Filed Dec. 27, 1976, Ser. No. 754,872
Int. Cl.[2] B61D *3/08, 5/18, 5/20, 5/52*
U.S. Cl. 105—182 R 5 Claims



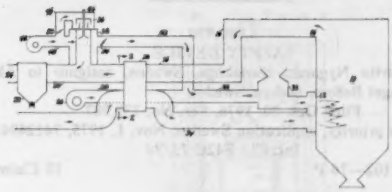
1. A railway truck comprising in combination, side frame members having weaving movement on supporting axles, a center post about which the side frame members turn and weave, and a bearing ring means integral with and carried by internal extensions of said side frame members retainingly completely encircling said center post, and said center post having a removable end cap for retaining said bearing ring means about said center post.

4,090,455

BOILER START-UP AIR HEATER

Michael Scott McCartney, Bloomfield, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Apr. 4, 1977, Ser. No. 784,017
Int. Cl.[2] F23K *1/04, 3/02;* F23L *15/02*
U.S. Cl. 110—232 7 Claims



1. Coal burning apparatus including a furnace having an exhaust port for the exhaust of hot products of combustion therefrom, heat exchange apparatus, a hot gas duct traversing said heat exchange apparatus and terminating in the exhaust port of said furnace, a dust collector, a cooled gas duct connecting the dust collector to the exhaust duct to conduct cooled gas from the heat exchanger to the dust collector, a first source of primary air for combustion, a source of coal, a mill for drying and pulverizing coal, means directing coal from said source through the mill and to the furnace, a primary air duct conducting primary air from the source of primary air through the heat exchanger in heat exchange relation with the hot gas from the furnace and through the coal drying mills before it is exhausted into the furnace, an independent air heater comprising a heat exchanger that is heated by an independently fired burner, a second source of primary air, and an auxiliary duct means directing air from said second source through the independent air heater and into the primary air duct intermediate the coal drying and pulverizing mills and the heat exchange apparatus whereby said mills absorb heat from the independent air heater when the heat exchanger is cold.

4,090,456

FURROW OPENER AND APPARATUS FOR NO-TILLAGE TRANSPLANTERS AND PLANTERS

John E. Morrison, Jr., Lexington, Ky., and Charlie F. Abrams, Jr., Raleigh, N.C., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Oct. 2, 1975, Ser. No. 618,971
Int. Cl.[2] A01C *23/02*
U.S. Cl. 111—3 13 Claims

1. An apparatus for the opening of furrows under no-tillage conditions comprising:

(a) a first angle tool bar set at an angle to the horizontal;

(b) two depth gauge wheels;

(c) strut members adjustably secured at one end to said first tool bar and rigidly secured at the other end to said depth gauge wheels;

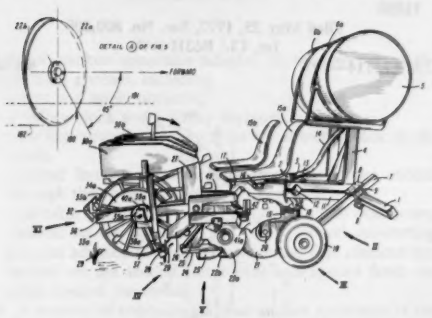
(d) a liquid reservoir mounted to the first angled tool bar, said reservoir further including a hose attached to the bottom of the reservoir, and a water metering valve for dispensing water communicating with said hose;

(e) a second angled tool bar;

(f) parallel extension members secured at one end to said first angled tool bar and at the other end to said second angled tool bar;

(g) an upper frame assembly rigidly attached to said second angled tool bar;

(h) a vertical rear pivot shaft rigidly affixed to said upper frame assembly;
(i) a front frame pivot shaft complimentarily angled at the top and rigidly affixed to said second angled tool bar;
(j) a front frame assembly pivotally attached to said front frame pivot shaft;
(k) a furrow opening assembly comprising a combination:
(1) first vertical strut members rigidly attached at one end to said front frame assembly;
(2) a rolling coulter attached to the other end of said vertical strut members;
(3) a second vertical strut member attached at one end to said front frame assembly rearward of said rolling coulter;
(4) two flat discs attached to the other end of said second vertical strut member in a manner such that said flat discs are on opposite sides of said rolling coulter and are at an angle to the vertical;
(5) a point of reference on the circumference of said flat discs which is determined as follows:



(a) draw a circle and bisect it with horizontal and vertical lines through the center, let that circle represent the face of the discs, and in the lower right quadrant bisect the circumference of the circle with radius 45° below the horizontal, that point on the circumference where the radius bisects it will represent the closest point at which the discs must be angled together to achieve the optimum opening results, said flat discs so angularly mounted and operated below the surface of the soil, laterally move soil, in two directions forming a furrow;
(6) A v-shaped boot rigidly attached to said second vertical strut member;
(7) a pair of winged-shaped members rigidly attached to said v-shaped boot which extend backward along the furrow to hold the furrow open;
(8) two parallel rigid angled plant guides attached at one end to said wing-shaped members and at the other end to said front end frame assembly;
(l) a middle frame assembly pivotally connected to said upper frame assembly by said vertical rear pivot shaft and in slidable contact with said front frame assembly.

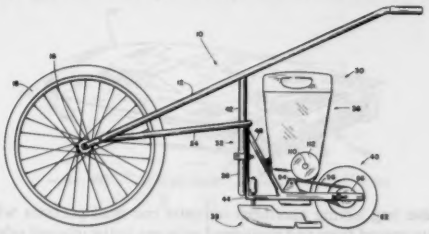
4,090,457

MULTI-PURPOSE GARDEN TOOL

Glendell Roberts, Rte. 3, Box 29, Bristow, Okla. 74010

Continuation of Ser. No. 601,451, Aug. 4, 1975, abandoned. This application Jun. 6, 1977, Ser. No. 804,052
Int. Cl.[2] F23B *1/00*
U.S. Cl. 111—82 **5 Claims**

1. A multi-purpose garden tool adapted to be moved over the soil and comprising:
(a) a frame;
(b) means for distributing seed carried by the frame; and
(c) plow carried by the frame and disposed beneath the means for distributing seed, said plow comprising a leading end plow point for opening a furrow, transversely spaced sidewalls attached to the plow point and extending generally rearwardly therefrom for holding the furrow open and for receiving seed from the means for distributing seed therethrough for deposit in the open furrow, the upper trailing portions of the sidewalls being tapered inwardly, the lower trailing portions of the sidewalls extending outwardly to form outwardly extending wing plates for gathering the soil of the open furrow and closing said furrow over the deposited seed.

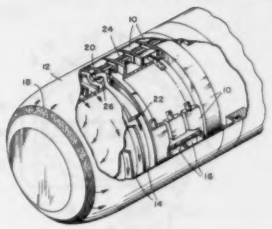


4,090,458

PRESSURE RESPONSIVE FLUID BAG EJECTOR

Paul C. Roberts, Pasadena, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 27, 1970, Ser. No. 43,256
Int. Cl.[2] F42B *19/00, 19/02*
U.S. Cl. 114—20 R **10 Claims**



1. In a fluid ejector which is responsive to pressure comprising:
elongated flexible bladder means which is capable of containing a fluid and which has an outlet end for expelling said fluid;
said bladder being progressively structurally stronger toward its outlet end throughout substantially the entire length of the bladder so that upon application of exterior fluid pressure the bladder will progressively eject the interior fluid toward said outlet without pinching off on itself.

4,090,459

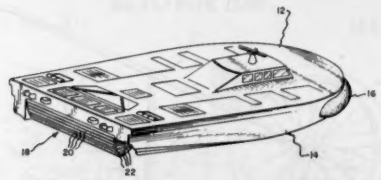
SIDE LUBRICATED SEAL DEVICE FOR A SURFACE EFFECT SHIP

John B. Chaplin, Covington, La., assignor to Textron Inc., Providence, R.I.

Filed Mar. 25, 1977, Ser. No. 781,292
Int. Cl.[2] B63B *1/38*
U.S. Cl. 114—67 A **9 Claims**

1. In combination, a surface effect ship of the type having at least two relatively spaced rigid wall structures each having inboard and outboard sides extending beneath the main body of

the ship into and below the water line of the ship to partially confine thereunder the ship support air cushion and having a seal device comprising a self-contained inflatable bag extending between the inboard sides of said rigid structures operating to assist in sealing the air cushion beneath said ship, said inflatable bag having apertured opposite end wall portions which are spaced from and positioned adjacent to the inboard sides of said spaced wall structures to permit egress of pressurized gas between the end wall portions of the bag and the inboard sides of the spaced wall portions so as to lubricate movements of said end wall portions relative to said rigid, spaced wall structures.



4,090,460

SPHERICAL TANK SUPPORTING SYSTEM FOR LOW TEMPERATURE LIQUIFIED GAS STORAGE TANK CARRYING VESSEL

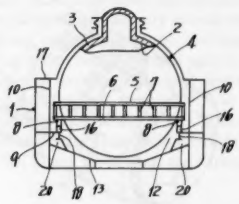
Ko Nishimaki; Tomiyasu Okamoto; Tsunanori Nishimoto; Taiji Kataza; Koji Harada; Seiichiro Murata; Masayoshi Higashimura, and Takanori Ito, all of Osaka, Japan, assignors to Hitachi Shipbuilding & Eng. Co., Ltd., Osaka, Japan

Filed Oct. 18, 1976, Ser. No. 733,075

Claims priority, application Japan, Oct. 20, 1975, 50-126595; Oct. 20, 1975, 50-126596; Oct. 20, 1975, 50-126597

Int. Cl.[2] B63B *25/08*

U.S. Cl. 114—74 A **2 Claims**



1. A spherical tank supporting system for a low temperature liquified gas storage tank carrying vessel, comprising:

a hold defined by bulkheads to form a spherical tank receiving compartment;

a support deck extending horizontally from said bulkheads at a level above the bottom of the hold, said support deck having a circular opening whose periphery surrounds said spherical tank;

an annular girder extending around and reinforcing the whole of the inner peripheral edge of the support deck, said annular girder having an I-shaped or rectangular cross section;

support means carried by the hull for supporting said support deck and annular girder, said support means comprising a number of brackets extending from the annular girder and the lower surface of the support deck to the bottom of the hold and connected at right angles to said bulkheads, the portions of the annular girder facing the corners of the hold being supported by a number of columns extending between the lower surface of the annular girder and the bottom of the hold;

a support ring horizontally projecting from the outer surface of the spherical tank;

a number of support chocks projecting from the lower surface of said support ring; and

pressure-resistant blocks attached to the support deck in opposed relation to said support chocks to radially slidably support the latter.

4,090,461

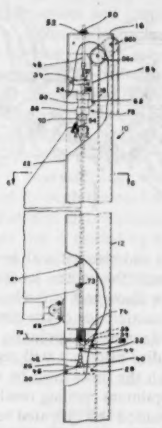
SAIL BOAT MAST CONTAINING SAIL FURLING DEVICE WITH SWIVEL HAUL-UP MEANS

Anthony Rusich, 4 Washington Pl., Port Washington, N.Y. 11050

Filed May 25, 1977, Ser. No. 800,209

Int. Cl.[2] B63H *9/04*

U.S. Cl. 114—107 **8 Claims**



1. In a sailboat mast of the type having a cavity therein for holding a sail which has a bead in its luff, the improvement comprising:

(a) a tension means having first and second ends in said cavity parallel to the axis of said mast;

(b) means for supporting the first and second ends of said tension member and for applying tension thereto;

(c) a rod surrounding said tension means;

(d) said rod being rotatable on said tension means;

(e) a C-shaped groove in said rod for retaining said bead;

(f) a swivel having first and second parts slidably disposed on said rod;

(g) means for attaching a sail-hoisting halyard to said swivel first part;

(h) means for attaching the head of said sail to said swivel second part;

(i) means for attaching a sail tack to said rod;

(j) a longitudinal slot in the aft of said mast at least along the entire length of the luff of the sail;

(k) means for rotating said rod upon said tension means whereby said sail is furled upon said rod within said mast;

(l) the swivel second part rotating with the rod and the sail; and

(m) the swivel first part being held substantially non-rotating.

4,090,462
DUAL ANCHOR APPARATUS AND METHOD OF USING SAME

Wadsworth W. Mount, Warren, N.J., assignor to Bossert Manufacturing Corporation, Utica, N.Y.

Filed May 10, 1977, Ser. No. 795,437
Int. Cl.[2] B63B *21/24*
U.S. Cl. 114—293 14 Claims

1. Dual anchor apparatus adapted to be lowered to the bottom from a vessel, including:
   a. lower and upper anchors;
   b. a pulley block and a pulley thereon;
   c. first line means extending from the lower anchor to the block;
   d. second line means extending from the upper anchor through the pulley to the vessel; and
   e. releasable connecting means including a first connecting element on the upper anchor and a second connecting element adapted to cooperate with the first element and located on the second line means and spaced from the block toward the vessel.

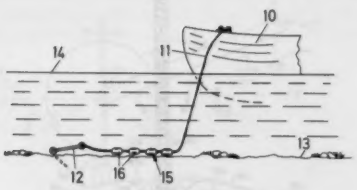
10. A method of implanting a dual anchor apparatus in the bottom of a body of water, comprising the steps of:
   a. lowering from a vessel a dual anchor assembly including lower and upper anchors, a pulley block, first line means extending from the lower anchor to the block, second line means extending from the upper anchor through a pulley on the block to the vessel, and a releasable connection between the upper anchor and the second line means at a locality thereon spaced from the block toward the vessel;
   b. continuing the lowering of the anchor assembly until the lower anchor touches the bottom;
   c. moving the vessel with the lower anchor in contact with the bottom to implant the lower anchor in the bottom in a direction determined by the direction of motion of the vessel;
   d. continuing the motion of the vessel in the same direction while paying out the second line means until the block and upper anchor touch the bottom;
   e. releasing said connection; and
   f. tightening the second line means to cause implanting of the upper anchor in the bottom in a direction opposite to the direction of implanting of the lower anchor.

4,090,463
ANCHORING MEANS

Gunnar Söderberg, Kvarnlyckan 7, Billdal, Sweden (43081)

Filed Feb. 7, 1977, Ser. No. 766,095
Claims priority, application Sweden, Feb. 11, 1976, 76014828
Int. Cl.[2] B63B *21/24*
U.S. Cl. 114—294 3 Claims

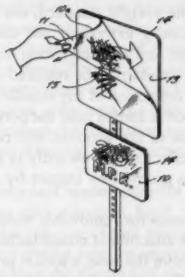
1. A boat anchoring means including an anchor, a hawser rope attached thereto as well as at least one sinker attachable to said hawser rope, at a distance from the anchor:
   1. each sinker including a body, formed as a symmetrical body of rotation, having an axial passage for reception of the rope, said passage, at least along part of its length, having an inwardly tapering form; and
   2. a tubular wedge member including a portion having a tapered body with a tapered envelope surface mating with the tapering surface of the passage and an internal surface adapted to enclose said hawser rope, the wedge member being manufactured of resilient material in one piece and including an end flange at the wider end of the tapered body with a short cylindrical portion formed as an extension at the other end of the tapered body, the cylindrical portion having a reduced diameter as compared to that of the narrower end of the tapering portion, at least two slots extending axially along the wedge member, the slots extending from the end flange through the tapered body portion and a considerable distance into the cylindrical portion.



4,090,464
VANDAL GUARD SHEET

John H. Bishopp, and George Spector, both of 3615 Woolworth Bldg., 233 Broadway, New York, N.Y. 10007

Filed Jun. 25, 1975, Ser. No. 590,351
Int. Cl.[2] G09F *7/12*
U.S. Cl. 116—63 R 1 Claim



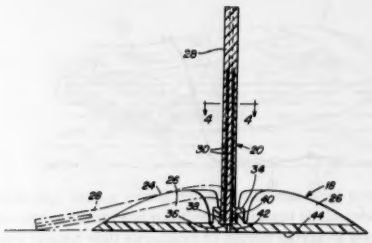
1. A vandal guard sheet sign assembly formed from a plurality of parts comprising a flat sign panel part and a transparent plastic guard sheet part having a transparent adhesive on its inner face whereby said sheet is secured removably on said panel part by means of said adhesive, said panel and sheet parts being of similar dimensions, said assembly including visible indicia permanently enscribed on one of said parts and wherein the sheet and panel parts are in complete planar contact adhesively with each other, when said sheet part is secured to said panel part in further combination with a frame mounted about the periphery of the assembly, said assembly having an exposed bottom edge, whereby said frame is channel shaped in cross-section except for a bottom portion which fits over the bottom edge of said assembly, said bottom portion having spaced outer and inner legs adjacent to a lower opening therebetween providing access to said bottom edge for replacing a used guard sheet, said indicia being imprinted on said panel.

4,090,465

TRAFFIC CONTROL DIRECTOR

George G. Bell, Sr., P.O. Box 1633, Jackson, Miss. 49205

Filed Dec. 21, 1976, Ser. No. 752,831
Int. Cl.[2] E01F *9/01;* G09F *7/18*
U.S. Cl. 116—63 R 9 Claims



1. A traffic control director, comprising, in combination:

(a) a base having a peripheral edge;

(b) flexible column means disposed extending substantially vertically from the base for normally supporting a sign above the base;

(c) recess means provided on the base for receiving a portion of the column means normally spaced from the base and recess means when the column means is deflected downwardly toward the base by impact from a passing vehicle, the base including an upwardly facing surface, and the recess means including at least one groove arranged extending away from the column means for receiving the column means, the groove being provided in the upwardly facing the surface of the base, the at least one groove being a plurality of grooves provided in the upwardly facing surface of the base, each of the grooves being arranged extending away from the column means and diverging from one another, the column means including a flexible upright standard, the standard comprising a longitudinally extending rod constructed from a resilient material, and a coiled spring imbedded in the rod for causing the standard to be restored to an upright position following deflection of the standard toward the base each of the grooves ending near the peripheral edge of the base so that one of the grooves will receive the column means when deflected downwardly in a direction toward said one of the grooves by impact by a passing vehicle; and

(d) attachment means for removably mounting the standard on the base, the attachment means including a hub extending upwardly from the base, a socket provided in the hub, internal screw threads provided in the socket, and external screw threads provided on the standard for engaging with the screw threads in the socket.

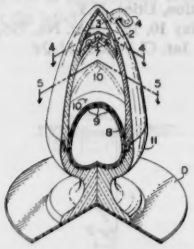
4,090,466

GAS ECONOMIZER

Stephen Jubinski, 98-1162 Iliee St., Honolulu, Hi. 96701

Filed Apr. 18, 1977, Ser. No. 788,587
Int. Cl.[2] F02B *77/08;* G01L *19/12*
U.S. Cl. 116—114 AE 5 Claims

1. A gas economizer indicator comprising an upper shell, an egg-shaped core, and a lower shell; the core includes a hollow casing with an opening in its top portion and an elastic coating thereabout which is adapted to be responsive to a selected degree of intake manifold vacuum of an internal combustion engine, the core is seated within the lower shell and is kept in place by the curved portion of the upper shell; the upper shell is threaded onto the lower shell to form an airtight transparent



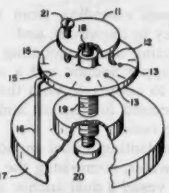
container except for an opening near the top of the upper shell, the shell top opening serves as a vacuum intake opening.

4,090,467

CONTROL POINT ADJUSTMENT MECHANISM

Frederick D. Joesting, Park Ridge, Ill., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jun. 28, 1976, Ser. No. 700,633
Int. Cl.[2] G01D *13/00;* G05B *23/00;* G09F *9/00*
U.S. Cl. 116—129 T 8 Claims



1. In a condition control system for controlling a load in accordance with a sensed condition, said system having both throttling range adjustment means for adjusting the throttling range of the system and control point adjustment means for establishing a control point for said system, an apparatus for compensating for changes in control point upon adjustment of said throttling range adjustment means by adjusting the control point adjustment means accordingly, said apparatus comprising:

first and second relatively adjustable means and support means, said first and second relatively adjustable means adjustable with respect to said support means, control point indicia affixed to one of said second relatively adjustable means and said base means and a control point pointer affixed to the other of said second relatively adjustable means and said base means, throttling range indicia affixed to one of said first and second relatively adjustable means and a throttling range pointer affixed to the other of said first and second relatively adjustable means, whereby said second relatively adjustable means may be adjusted until said control point pointer points to one of said control point indicia and said first relatively adjustable means may be adjusted until said throttling range pointer points to one of said throttling range indicia;

shaft means connected to at least one of said first and second relatively adjustable means and to said control point adjustment means; and,

locking means for locking said first and second relatively adjustable means together whereby, upon changes in throttling range, said locking means may be unlocked and said one of said first and second relatively adjustable means may be adjusted relative to the other of said first and second relatively adjustable means so that the throt-

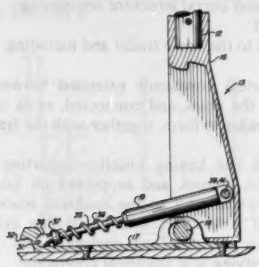
tling range pointer points to the new throttling range whereby said shaft means is moved to in turn adjust the control point adjustment means to compensate for changes in throttling range, and thereafter the locking means may lock the first and second relatively adjustable means together.

4,090,468

WARNING FLAG FOR VEHICLES

Gary L. D'Spain, 5212 Via Del Cielo, Paradise Valley, Ariz. 85253

Filed Mar. 21, 1977, Ser. No. 779,536
Int. Cl.[2] G08B 5/00
U.S. Cl. 116—132 R 5 Claims



1. A signal apparatus for use in combination with a vehicle comprising:

a base member for attachment to said vehicle, an arm member pivotally connected to said base member for movement from a position extendingly juxtaposed to said base member to a transverse position thereof and comprising a support means for a mast,

a mast attached to said support means for extending longitudinally of said arm member,

a signal device attached to the free end of said mast, said signal device indicating a predetermined condition by moving said mast to said transverse position,

abutment means mounted on said arm member and spaced from a pivotal connection of said arm member to said base for supporting said mast and arm member in its transverse position,

biasing means connected between points on said arm member and said base member for biasing said mast to said transverse position,

means for detachably connecting and holding said mast and arm member in its storage position juxtapositioned to said base member,

said means for detachably connecting and holding said shaft and arm member comprises a clamping means spaced from said base member for engaging said shaft adjacent said signal device,

said clamping means comprising a U-shaped slot for receiving longitudinally thereof a part of the length of said mast,

a latch slidably mounted on said clamping means laterally of the slot of said clamping means for releasably engaging said part of said mast, and

attachment means forming a part of said base member which interlock with a part of said arm member when said arm member is moved to its position juxtaposed to said base member,

said part of said base member comprising a first tab which engages with a second tab on said arm member when said arm member is juxtaposed to said base member,

said pivotal connection of said arm member to said base member comprising a lost motion connection, and

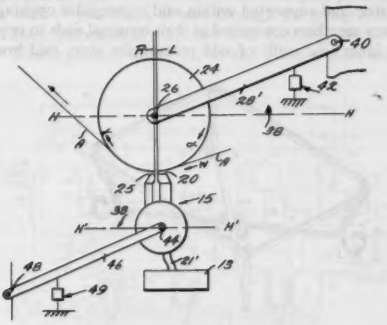
said second tab on said arm member slidably engaging with first tab of said base member under the effects of said biasing means when said arm member is juxtaposed to said base member.

4,090,469

BREAST ROLLER PIVOTING

Arthur W. Roberts, Jr., Colonial Heights, Va., assignor to Inta-Roto, Inc., Richmond, Va.

Filed Mar. 8, 1977, Ser. No. 775,582
Int. Cl.[2] B05C 3/12
U.S. Cl. 118—410 6 Claims



1. A web coating assembly comprising a source of heated high viscosity liquid coating material for coating a web; an extrusion head for applying the material onto a web, the extrusion head comprising an upper flat substantially horizontal surface having a narrow elongated opening formed therein of substantially the same length as the width of the extrusion head, said opening having a vertical centerline, said head having a forming lip and a coating thickness determination portion; means for supplying the material under pressure from said source to said extrusion head opening; a breast roller of hard material for contacting a web to be coated, said breast roller rotatable about a generally horizontal axis and positioned above said extrusion head opening for cooperation therewith, said breast roller being mounted with respect to said extrusion head so that no radius of said breast roller is coextensive with said extrusion head opening centerline and a lead-in wedge being formed by said roller and head forming lip; means for maintaining during coating the relative positions of said breast roller and said extrusion head; and means for feeding a web in contact with said breast roller past the lead-in wedge and then past said coating thickness determination portion, between said roller and said head forming lip; wherein the improvement comprises

means for mounting said breast roller for pivotal movement with respect to said extrusion head, to control coating thickness, so that the size of said lead-in wedge increases at a greater rate during relative movement between said head and roller than the distance of said coating thickness determination portion of said head from said roller, so that web breakage at said extrusion head opening is minimized, said means including a lever arm operatively connected to said breast roller substantially at the center thereof, and a stationary pivot point for said lever arm located on the same side of said vertical centerline of said extrusion head opening as said lead-in wedge formed by said roller and said head forming lip, and located vertically above a horizontal plane passing through the center of said breast roller.

4,090,470

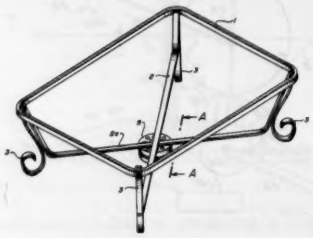
LITTER BOX

Robert W. Williams, 429 Cedar St., Lansdale, Pa. 19446

Filed Jun. 9, 1976, Ser. No. 694,190
Int. Cl.[2] A01K 29/00
U.S. Cl. 119—1 6 Claims

1. A cat litter device which comprises:

(1) a continuous rectangular strip with inner side walls and an upper surface which provides a support means;
(2) a rectangular opening with corners defined by the inner side walls of said rectangular strip;
(3) a litter container with an open top and closed bottom surface whose dimensions are essentially the same as those defined by the inner side walls of the continuous rectangular strip and supported within said rectangular opening;
(4) brace members connected at their terminal ends to opposite inner side walls of said rectangular strip; said brace



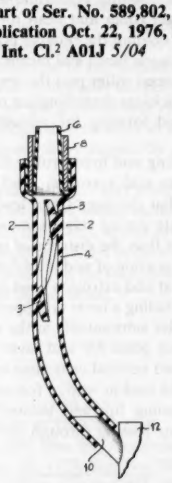
members being adapted to receive the litter container and provide it with support along its bottom surface;
(5) four leg members connected to each of the four corners of said rectangular strip and said terminal ends of said brace members, said leg members being of such a height as to maintain the brace members above ground level;
(6) a holding means attached to and located beneath at least one of said brace members; and
(7) a deodorizing means which fits said holding means for emitting deodorant vapors throughout the area surrounding said litter container.

4,090,471

SHORT MILK TUBE OF A MILKING MACHINE

Paul D. Thompson, Burtonsville, Md., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Continuation-in-part of Ser. No. 589,802, Jun. 24, 1975, abandoned. This application Oct. 22, 1976, Ser. No. 734,937
Int. Cl.[2] A01J *5/04*
U.S. Cl. 119—14.51 **7 Claims**



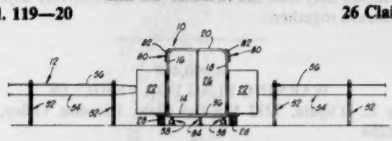
1. In a milking apparatus wherein a teat cup and liner are joined to a ferrule of the claw by a straight, flexible short milk tube, the improvement which comprises at least one spiral projection extending through at least three hundred and sixty degrees and extending inwardly from the inner surface of said short milk tube a substantial distance up to slightly more than one-half the inner diameter of said short milk tube.

4,090,472

HORSE TRAILER AND CORRAL STRUCTURE

Leon V. York, P.O. Box 18315, Oklahoma City, Okla. 73118

Filed Nov. 1, 1976, Ser. No. 737,408
Int. Cl.[2] A01K *3/00*
U.S. Cl. 119—20 **26 Claims**



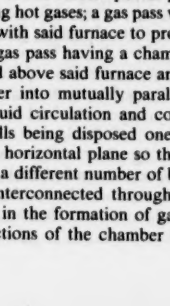
1. A horse trailer and corral structure comprising:
a horse trailer; and
a corral connected to the horse trailer and including: spaced fence posts;
a flexible electrical conductor extended between and supported by the posts, and connected, at its opposite ends, to the trailer to form, together with the trailer, an enclosure;
a flexible guard line having visibility-imparting means forming a part thereof, and supported on said posts outwardly, with respect to the enclosed space, from said electrical conductor, said guard line extending around a major portion of said enclosure; and
means for electrifying said electrical conductor.

4,090,473

STEAM GENERATOR FOR STEAM POWER PLANT

Nikolai Vasilievich Golovanov, prospekt Energetikov, 48, kv. 20; Vitaly Alexandrovich Ivanov, ulitsa Vavilovykh, 172, kv. 84; Vyacheslav Vladimirovich Mitor, ulitsa Parkhomenko, 2/13, kv. 95, all of Leningrad; Anatoly Alexeevich Parshin, ulitsa Lenina, 4, kv. 21, Taganrog Rostovskoi oblasti; Fedor Vasilievich Sapozhnikov, ulitsa Nikolaeva, 4, kv. 12, Moscow; Sergei Mikhailovich Ter-Minosian, Kotlostroitelnaya ulitsa, 21, kv. 10, Taganrog Rostovskoi oblasti, and Evgeny Kirillovich Chavchanidze, prospekt Nauki, 24-1, kv. 107, Leningrad, all of U.S.S.R.

Filed May 27, 1976, Ser. No. 690,776
Int. Cl.[2] F22B *21/24*
U.S. Cl. 122—6 A **1 Claim**



1. A steam generator for a steam power plant, comprising a furnace for generating hot gases; a gas pass with means providing communication with said furnace to provide a passage for said hot gases; said gas pass having a chamber for partial hot gas cooling arranged above said furnace and including means dividing the chamber into mutually parallel sections; water walls adapted for fluid circulation and constituting said gas pass; said water walls being disposed one above another in height and bent in a horizontal plane so that each element of each water wall has a different number of bends, the adjacent water walls being interconnected through the top points of said bends resulting in the formation of gas pass sections together with said sections of the chamber for partial hot gas

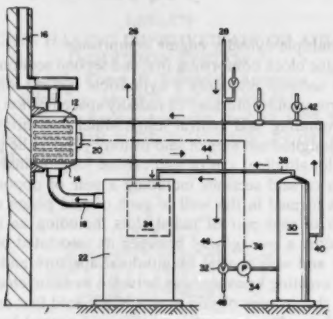
cooling, each water wall element comprising an all-welded construction including tubes arranged one above another and mutually parallel so that the tubes of each element are directed essentially at right angles to the direction of hot gas flow, each water wall element including at least two inlet and two outlet headers, the tubes of said water wall element being connected to each of said headers so that the fluid in the adjacent tubes flow in counterflow.

4,090,474

HOT WATER BOOSTER

Walter E. Kauffmann, 67 Morton St., Brentwood, N.Y. 11717

Filed Jun. 4, 1976, Ser. No. 692,799
Int. Cl.[2] F22D *1/00*; F22B *1/18*
U.S. Cl. 122—20 B **2 Claims**



1. A heating system comprising a fuel consuming furnace having an exhaust flue for the egress of stacked gases, a water pre-heating coil, said water pre-heating coil installed within said exhaust flue, said water pre-heating coil having first and second pipes at the ends thereof, said fuel consuming furnace having heating coils therein, said heating coils having an inlet end and an outlet end for the passage of water therethrough, said outlet end for communicating hot water for consumption, a water storage and mixing tank, said water storage and mixing tank having first and second outlet pipes communicating to the interior of said water storage and mixing tank, said first outlet pipe of said storage and mixing tank fluidly communicating with said inlet end of said heating coils, said second outlet pipe of said storage and mixing tank fluidly communicating with said second pipe, a cold water supply pipe, said cold water supply pipe communicating fluidly to a source of cold water, said cold water supply pipe and said first pipe of said water pre-heating coil fluidly communicating to each other into an inlet pipe communicating to said interior of said storage and mixing tank a heat sensor, said heat sensor being disposed adjacent said exhaust flue in the vicinity of the location of said water pre-heating coil, said heat sensor for operating a pump, said pump discharging water into said inlet pipe of said storage and mixing tank wherein the temperature sensed by said heat sensor is elevated to a predetermined level.

4,090,475

SELF-CLEANING FLUID INJECTION SYSTEM

Philip H. Kwan, Pasadena, Calif., assignor to S. E. Rykoff & Co., Los Angeles, Calif.

Filed May 19, 1976, Ser. No. 687,700
Int. Cl.[2] D06F *33/02*
U.S. Cl. 222—70 **13 Claims**

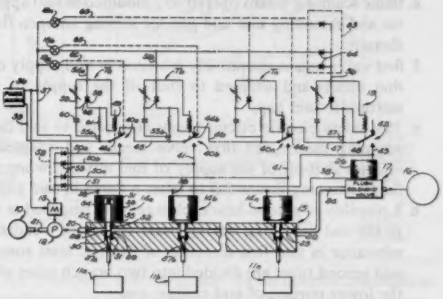
1. A fluid injection apparatus comprising:

pump means for delivering a plurality of different additive fluids to equipment utilizing said fluids;

a plurality of valves controlling flow of said different fluids respectively to the suction side of said pump means, and each including a valve element movable toward and away from a valve seat;

flushing means operable to produce a flow of flushing water to clean the valves and the pump means when the valves are closed;

timer means operable automatically through a cycle to first open at least some of said valves to pass predetermined ones of said fluids to and through the pump means, and then automatically actuate said flushing means to pass flushing water to the valves and pump means; and



a manifold structure containing a common discharge passage conducting said different fluids from said plurality of valves to said pump means, and defining a common flow path through which flushing water is directed past the discharge sides of said valves sequentially;

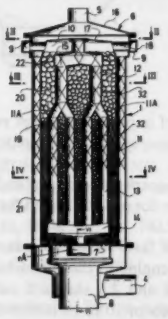
said movable valve elements being positioned in said manifold structure and within said common flow path in a relation causing a moving stream of said flushing water in said passage to flow directly past and in washing contact with each of the valve elements to clean it.

4,090,476

METHOD AND APPARATUS FOR THE COMBUSTION OF GASEOUS OR LIQUID FUELS

Vaclav Rybar; Radovan Drapal, and Radim Kabelik, all of Prague, Czechoslovakia, assignors to Stav, Praha, vyrobni stavebni druzstvo stredisko Monta, Prague, Czechoslovakia

Filed Nov. 18, 1976, Ser. No. 743,158
Claims priority, application Czechoslovakia, Nov. 18, 1975, 7776-75
Int. Cl.[2] F23D *13/18*; F22B *21/00*
U.S. Cl. 122—367 PF **6 Claims**



1. An apparatus for the combustion of gaseous or liquid fuels by substantially flameless non-catalytic combustion of a mixture of the fuel with an oxidising agent, said mixture flowing through said apparatus in a first direction of flow, comprising in combination,

a. an imperforate jacket having a plurality of parallel first

tubes, whose axes are parallel to said first direction of flow of said fuel mixture;

b. a gas permeable charge of a radiation substance disposed within said jacket and having a free upper layer;

c. a cover plate mounted in spaced relationship above said free upper layer of said radiation substance; said cover plate and free upper layer defining an ignition and flame scanning gap therebetween;

d. supply conduit means operatively mounted in said apparatus for conducting said fuel mixture to said gap;

e. flame scanning means operatively mounted in said apparatus and extending into said gap for sensing an open flame therein;

f. first valve means operatively mounted in said supply conduit means and adapted to shut-off the supply of fuel mixture to said gap;

g. first safety electric circuit means connected to said flame scanning means and first valve means and adapted to effect a shut-off of the supply of fuel mixture when said flame scanning means fail to sense a flame in said gap;

h. a plurality of second heat exchange tubes disposed in said jacket and extending through said charge of a radiation substance in said first direction of flow, at least some of said second tubes are divided into two branch tubes along the lower portion of said charge; and

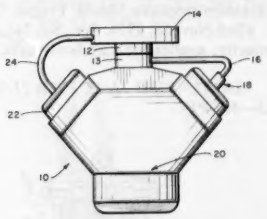
i. common collector means connected to the lower ends of said second tubes.

4,090,477

METHOD OF IMPROVING OPERATION OF INTERNAL COMBUSTION ENGINES

Jack L. Gockel, San Diego, Calif., assignor to Cragar Industries, Inc., Compton, Calif.

Filed Sep. 3, 1976, Ser. No. 720,186
Int. Cl.² F02M *25/06;* F02P *5/04*
U.S. Cl. 123—1 R **8 Claims**



1. A method of improving exhaust emissions and fuel economy for an engine operating at predetermined altitudes and comprising:

advancing the spark between one and one-half engine crankshaft degrees for each thousand feet of elevation above sea level;

controlling the flow volume of gas vented from the crankcase of the engine to the carburetor to a flow volume of between 0.8 and 2.5 standard cubic feet per minute at vacuum levels of 10 to 14 inches of mercury and increasing to 5 to 8 cubic feet per minute at 4 or 5 inches of mercury according to the cubic inch displacement of said engine;

adjusting the carburetor idle mixture screw to approximately a lean - best - condition; and

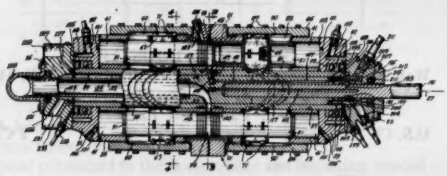
adjust said engine idle speed screw to adjust the engine speed to a predetermined setting.

4,090,478

MULTIPLE CYLINDER SINUSOIDAL ENGINE

James A. Trimble, 7352 58th Ave. NE., Seattle, Wash. 98115, and Ervin L. Crosby, 23917 114th Pl. W., Edmonds, Wash. 98020

Filed Jul. 26, 1976, Ser. No. 708,375
Int. Cl.² F02B *75/26;* F01B *13/06;* F16H *33/00*
U.S. Cl. 123—58 R **28 Claims**



1. A multiple cylinder engine comprising:

an engine block comprising first and second sections, each of said sections including a cylindrical central longitudinal aperture and a plurality of radially spaced piston cylinders surrounding said central longitudinal aperture such that the longitudinal axes of said piston cylinders lie parallel to the longitudinal axis of said central longitudinal aperture, each of said sections including a pair of opposed radial slots formed in the wall of each of said piston cylinders, each of said pair of radial slots including an inner slot creating a passageway between its associated piston cyliner and said central longitudinal aperture and an outer slot creating a passageway between its associated cylinder and the exterior of said engine block, said first and second sections affixed together so that said central longitudinal apertures of said sections are aligned with one another along a common longitudinal axis and such that said plurality of piston cylinders are aligned with one another on a one-to-one basis;

a cylindrical sine shaft rotatably mounted in said cylindrical central longitudinal aperture, said sine shaft including at least two sinusoidal grooves formed in its outer periphery, each of said sinusoidal grooves covering two entire sinusoidal waves only, said sinusoidal grooves being 180° out of phase with one another, one of said sinusoidal grooves being aligned with said inner radial slots in said first engine block section and the other sinusoidal groove being aligned with said inner radial slots in said second engine block section;

a plurality of elongate pistons, one of said pistons mounted in each of said plurality of piston cylinders so as to be reciprocable back and forth therein along a reciprocating path of travel, the pistons mounted in aligned piston cylinders and said surrounding area of said piston cylinders forming a chamber suitable for receiving a driving medium adapted to expand in said chambers and cause aligned pistons to move away from one another along said reciprocating path of travel, each of said plurality of pistons including an aperture passing centrally through said piston between the ends thereof and along an axis lying orthogonal to the longitudinal axis of said piston, said piston apertures positioned in said pistons so as to be alignable with the radial slots formed in the wall of the piston cylinder in which each piston is mounted;

a plurality of coupling mechanisms, one coupling mechanism mounted in each of said piston apertures, each of said coupling mechanisms including a pair of blocks suitably slidably mounted in said piston apertures and a spring mounted between said blocks so as to push said blocks away from one another, the length of said blocks being such that the ends of said blocks extend beyond said piston apertures into said radial slots, said block extending through said inner radial slot including a ball bearing race located at its outer end, said plurality of coupling mechanisms further including ball bearings mounted in said ball

bearing races in said blocks passing through said inner radial slots and in the sinusoidal groove in the said sine shaft aligned with said inner radial slots, said coupling mechanisms further including retaining means for slidably retaining the outer ends of said blocks extending through said outer radial slots so that said springs produce a force that projects inwardly and presses said ball bearing into said sinusoidal grooves whereby the reciprocating movement of said pistons is transmitted into rotary sine shaft motion; and,

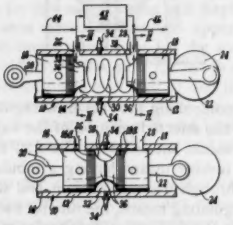
conduit means formed in said sine shaft for sequentially directing a driving medium from a source thereof into each of said piston cylinder chambers when said pistons mounted in said piston cylinders are moving through predetermined positions in their related reciprocating path of travel.

4,090,479

I.C. ENGINE HAVING IMPROVED AIR OR AIR-FUEL INDUCTION SYSTEM

Frank Kaye, 16 Niki Court, E. Bentleigh, Australia

Filed Jun. 14, 1976, Ser. No. 695,562
Claims priority, application Australia, Jun. 23, 1975, PC-2075
Int. Cl.[2] F02B *25/08, 25/10, 23/00, 19/08*
U.S. Cl. 123—30 C **11 Claims**



1. An internal combustion engine having:

at least one cylinder in which an induction piston and an exhaust piston are oppositely reciprocable between their top dead center and bottom dead center positions;

induction port means for the induction to said cylinder of at least one of air and a mixture of air and fuel in a helical, circular flow in said cylinder, and

an exhaust port means for exhaustion from said cylinder of combustion gases;

each of said pistons having a tapered crown defined by a circumferential surface and terminating in an end surface extending transversely of said piston, said tapered crown being such that, when said pistons are adjacent their top dead center positions, said end surfaces are closely juxtaposed and said circumferential surfaces define with an intermediate section of the cylinder an annular combustion zone in which said helical circular flow is constrained;

said induction port means comprising at least one induction port extending substantially tangentially of said cylinder so as to give rise to said helical, circular flow, and being located along said cylinder such that its extent axially of the cylinder is substantially within the axial extent of the induction piston crown, when the latter is in its bottom dead center position, so that the circumferential surface of that crown guides said helical circular flow; and

said exhaust port means comprising at least one exhaust port extending substantially tangentially of said cylinder, and being located laterally of the crown of said exhaust piston when the latter is in its bottom dead center position so as to receive combustion gases in a continuation of said helical, circular flow;

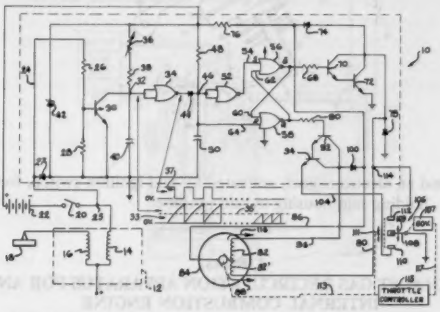
there being at least one spark plug for said combustion zone provided in said intermediate cylinder section.

4,090,480

ELECTRICAL OVERSPEED CONTROL FOR AN ENGINE

Stanley J. Kasiewicz, 29852 Springhill Dr., Southfield, Mich. 48076

Filed May 3, 1977, Ser. No. 793,475
Int. Cl.[2] F02D *11/10*
U.S. Cl. 123—102 **6 Claims**



1. An overspeed control system for an internal combustion engine having an ignition circuit and throttle control means, said control system including a reversible electric motor adapted to be connected with said throttle control means, a speed signal circuit adapted to be connected with said ignition circuit for developing an analog voltage corresponding to engine speed, a level detector connected with said speed signal circuit for developing a speed logic signal having one logic state when the engine speed exceeds a predetermined value and another logic state when the engine speed is less than said predetermined value, a flip-flop having first and second inputs and first and second outputs, said first output being at logical high when said first input is at logical high and said second output being at logical high when said second input is at logical high, an inverter having its input connected with the output of the level detector and having its output connected with the first input of the flip-flop, the output of said level detector also being connected with the second input of the flip-flop, said reversible motor having a forward winding and a reverse winding, a first power transistor coupled between the first output of said flip-flop and one of said windings and a second power transistor coupled between the second output of said flip-flop and the other of said windings, whereby said windings are selectively energized one at a time in accordance with the logic state of the output of said level detector.

4,090,481

THROTTLE CLOSING MECHANISM FOR INTERNAL COMBUSTION ENGINE

Reinhard Gospodar, Wolfsburg, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Germany

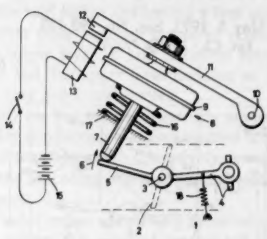
Filed Nov. 22, 1976, Ser. No. 743,916
Claims priority, application Germany, Nov. 29, 1975, 2553894
Int. Cl.[2] F02D *11/08*
U.S. Cl. 123—103 E **6 Claims**

1. A throttle closing mechanism for use in conjunction with an internal combustion engine having an ignition switch, comprising:

throttle linkage, connected to a throttle flap, and moveably mounted with respect to said engine to open and close said throttle flap;

a throttle closer, comprising a housing and a plunger, said housing mounted to said engine and moveable into and out

of a position wherein said plunger engages said linkage prior to the closing of said flap;



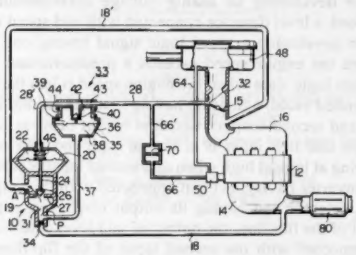
and an electromagnet, activated by said ignition switch, for holding said housing in said position.

4,090,482

EXHAUST GAS RECIRCULATION APPARATUS FOR AN INTERNAL COMBUSTION ENGINE

Masakazu Yoshida, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Nov. 4, 1976, Ser. No. 739,010
Claims priority, application Japan, Aug. 5, 1976, 51-10397[U]
Int. Cl.[2] F02M *25/06*
U.S. Cl. 123—119 A **3 Claims**



1. Apparatus for controlling the emission of noxious gases from an internal combustion engine comprising, an intake conduit having a throttle valve therein and exhaust conduit, a catalytic converter in said exhaust conduit, a conduit for recirculating exhaust gases from said exhaust conduit upstream of said converter to said intake conduit downstream of said throttle valve, a normally closed valve controlling flow through said recirculation conduit, means responsive to vacuum upstream of the closed position of said throttle to open said flow controlling valve, means responsive to increases in exhaust gas pressure from a predetermined level to increase the effect of said vacuum responsive means and means responsive to an engine operating temperature below a predetermined value for reducing the effect of said vacuum responsive means.

4,090,483

CARBURETOR DEVICE, ESPECIALLY FOR INTERNAL COMBUSTION ENGINES

Franz Weidlich, Strandvägen 55, Sollentuna, Sweden (191 45)

Filed Jun. 14, 1976, Ser. No. 695,829
Claims priority, application Sweden, Jun. 13, 1975, 7506784
Int. Cl.[2] F02M *25/00*
U.S. Cl. 123—119 A **7 Claims**

1. A carburetor device for an internal combustion engine generating exhaust gases under pressure, comprising

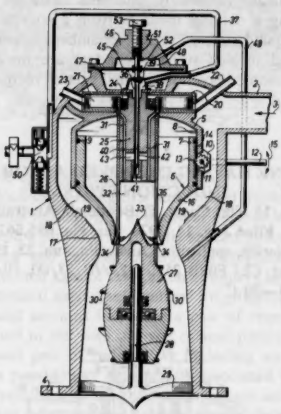
(a) a combustion air intake duct,

(b) a controllable valve means in the air intake duct,

(c) means for displacing the valve means into selected positions for adjusting combustion air flow through the duct,

(d) a source of fuel supply,

(e) a fuel flow regulating means disposed within the valve means, the fuel flow regulating means having an upstream portion connected to the fuel supply source for receiving fuel therefrom and a downstream portion defining fuel distribution outlet means opening into the duct for mixing the fuel with the air therein,



(f) means for controlling the fuel flow regulating means in response to the selected position of the valve means,

(g) a turbine means mounted on the fuel flow regulating means, the turbine means having a tubular hub portion extending through the valve means and surrounding the fuel flow regulating means, the tubular hub portion being connected to the fuel outlet distribution means, and

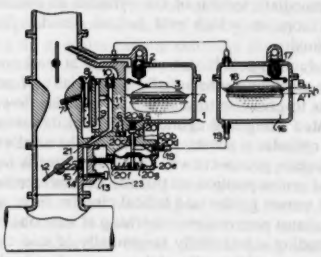
(h) conduit means delivering exhaust gases generated by the engine to the turbine means for driving the turbine means and thereby rotating the tubular hub portion thereof.

4,090,484

FUEL SUPPLY SYSTEM FOR MULTI-FUEL INTERNAL COMBUSTION ENGINES

Yukinori Itoh, Kawagoe; Mituhiko Shibata, Asukabe; Akira Masuda; Yasuo Ohtake, both of Ohmiya, and Motoaki Etoh, Ageo, all of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 11, 1976, Ser. No. 713,512
Int. Cl.[2] F02M *13/00, 13/09, 13/08*
U.S. Cl. 123—127 **3 Claims**



1. A fuel supply system for multi-fuel internal combustion engines having a carburetor intake passage with a throttle valve therein comprising

a carburetor including a wall defining the carburetor intake

passage and a main nozzle communicating with said intake passage,

a first fuel float chamber having a first fuel therein and defining a first chamber bottom port,

a second fuel float chamber having a second fuel therein, said second fuel float chamber being adjacent said carburetor and defining a second chamber bottom port,

valve means, comprising a selector valve and a vacuum actuator operatively connected to said selector valve, being disposed at a position adjacent said carburetor,

said selector valve being vertically disposed under a bottom of said second fuel float chamber, said selector valve cooperatively comprising two valve ports including an upper valve port communicating with said second chamber bottom port of said second fuel float chamber, and a lower valve port communicating with said first chamber bottom port of said first fuel float chamber, a main jet communicating with said two valve ports during an open condition of said valve ports and with said main nozzle of said carburetor, and a piston means for opening both of said two valve ports on the one hand, and for closing respectively either of said two valve ports, on the other hand,

said vacuum actuator being disposed adjacent said carburetor, said vacuum actuator including a diaphragm defining on a lower side of said diaphragm a vacuum chamber disposed adjacent said intake passage of said carburetor,

said diaphragm being connected to said piston means,

spring means for upwardly biasing said diaphragm for pressing said piston means against said upper valve port for closing said upper valve port for the second fuel while opening said lower valve port for the first fuel,

a vacuum inlet means in said wall of said intake passage of said carburetor at a distance of 0.5 to 5 mm above a closed position of the throttle valve in said intake passage, said vacuum inlet means being adjacent said vacuum chamber, and

passage means for communicating said vacuum chamber with the adjacent said vacuum inlet means, whereby said passage means is short and vacuum may be transmitted to said vacuum chamber for downwardly biasing said diaphragm against said spring means to cause said piston means to open said upper valve port for the second fuel and to close said lower valve port at a middle load zone, and to cause said piston means to open both of said valve ports for supplying a mixture of both of the fuels at lighter and heavier load zones, respectively, than the middle load zone, and to cause said piston means to open said lower valve port for the first fuel and to close said upper valve port for the second fuel at lightest and heaviest load zones, respectively.

4,090,485

FUEL SYSTEMS FOR INTERNAL COMBUSTION ENGINES

Mario V. LaCreta, Kent, Ohio, assignor to Antonio LaCreta, Scottsdale, Ariz., a part interest

Filed Mar. 28, 1977, Ser. No. 782,177
Int. Cl.[2] F02M *17/18*
U.S. Cl. 123—133 **10 Claims**

1. A fuel system for liquid hydrocarbon burning engines comprising in combination:

a chamber having fluid inlet and outlet ports and defining a vaporization zone and a vapor collecting and mixing zone,

means for connecting a source of liquid hydrocarbon fuel under pressure through said fluid inlet port to said vaporization zone,

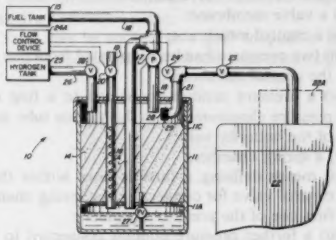
an air intake manifold connected to said vaporization zone of said chamber,

said intake manifold providing a means for dispersing air throughout said vaporization zone for aiding in the vaporizing of the fuel dispersed throughout the vaporization zone,

a first conduit means leading from said outlet port of said chamber arranged in said collecting and vapor mixing zone to either a hydrocarbon burning engine or carburetor therefore,

said first conduit means being provided with an air intake port for injecting air into said first conduit means under negative pressure of the engine used with said fuel system,

a second conduit means leading from a source of hydrogen to said collecting and mixing zone,



valve means for selectively controlling the flow of hydrogen through said second conduit means into said collecting and mixing zone, and

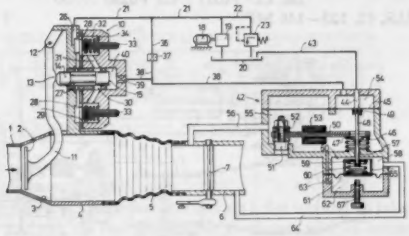
porous material positioned within said vaporization zone for dispersing said fuel in the form of finely divided droplets, said air from said air intake manifold vaporizing the droplets into fumes throughout said vaporization zone.

4,090,486

FUEL INJECTION SYSTEM

Gerhard Stumpp, and Hermann Grieshaber, both of Stuttgart, Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Sep. 9, 1976, Ser. No. 721,896
Claims priority, application Germany, Oct. 7, 1975, 2544800
Int. Cl.[2] F02M *39/00;* **F02D** *1/06*
U.S. Cl. 123—139 AW **4 Claims**



1. A fuel injection system for externally ignited internal combustion engines comprising, in combination:

(a) a suction tube for air intake to the engine;

(b) an air sensor disposed in said suction tube;

(c) an arbitrarily operable butterfly valve disposed in said suction tube in series with said air sensor;

(d) a fuel supply conduit;

(e) a control pressure conduit;

(f) a fuel metering valve connected to said fuel supply conduit and said control pressure conduit for continuously injecting fuel into said suction tube;

(g) a control plunger, serving as the movable member of said fuel metering valve, said control plunger being acted upon on one end by said air sensor, and on an opposite end by a return force provided by liquid under constant but arbitrarily variable pressure delivered by said control pressure conduit, for metering a fuel quantity that is proportionate to the quantity of air measured by said air sensor; and

(h) at least one pressure control valve in the form of a flat seat valve having a membrane as the movable valve part, said pressure control valve being disposed in said control pressure conduit for varying pressure in said control pressure conduit in dependence on at least one operating parameter of the engine and thereby varying the fuel-air ratio during load changes, and in particular for enriching the fuel-air mixture during full load operation, wherein the pressure control valve includes:
(i) a valve membrane;
(ii) a control membrane;
(iii) two pressure chambers separated from one another by the control membrane;
(iv) a pressure conduit connected to a first one of the pressure chambers and to the suction tube downstream of the butterfly valve;
(v) a spring chamber;
(vi) means defining a throttle bore within the pressure control valve for connecting the spring chamber to the first one of the pressure chambers;
(vii) a further pressure conduit connected to the spring chamber and to the suction tube between the air sensor and the butterfly valve;
(viii) another pressure conduit connected to a second one of the pressure chambers and to the spring chamber;
(ix) a control spring disposed in the first one of the pressure chambers, said control spring acting against the control membrane;
(x) a valve spring disposed in the spring chamber, said valve spring acting against the valve membrane; and
(xi) a transmission pin disposed between the valve membrane and the control membrane.

4,090,487

FUEL INJECTION SYSTEM

Gerhard Stumpp, and Hermann Grieshaber, both of Stuttgart, Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Sep. 10, 1976, Ser. No. 722,209
Claims priority, application Germany, Oct. 7, 1975, 2544810
Int. Cl.² F02D *1/06;* F02M *39/00*
U.S. Cl. 123—140 MP **7 Claims**

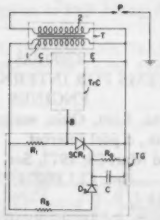
1. A fuel injection system for externally ignited internal combustion engines comprising, in combination:
a. a suction tube for air intake to the engine;
b. an air sensor disposed in said suction tube;
c. an arbitrarily operable butterfly valve disposed in said suction tube in series with said air sensor;
d. a fuel supply conduit;
e. a control pressure conduit;
f. a fuel metering valve connected to said fuel supply conduit and said control pressure conduit for continuously injecting fuel into said suction tube;
g. a control plunger; serving as the movable member of said fuel metering valve, said control plunger being acted upon on one end by said air sensor, and on an opposite end by a return force provided by liquid under constant but arbitrarily variable pressure delivered by said control pressure conduit, for metering a fuel quantity that is proportionate to the quantity of air measured by said air sensor; and
h. at least one pressure control valve in the form of a flat seat valve having a membrane as the movable valve part, said pressure control valve being disposed in said control pressure conduit for varying pressure in said control pressure conduit in dependence on at least one operating parameter of the engine and thereby varying the fuel-air ratio during load changes wherein said pressure control valve includes:
(i) a valve membrane;
(ii) a control membrane;
(iii) two pressure chambers separated from one another by said control membrane;
(iv) means defining a throttle bore within the pressure control valve for connecting the pressure chambers;
(v) a pressure conduit connected to a first one of the pressure chambers and to the suction tube downstream of the butterfly valve;
(vi) a spring chamber;
(vii) means defining another throttle bore within the pressure control valve for connecting the spring chamber to the first one of the pressure chambers;
(viii) a further pressure conduit connected to the spring chamber and to the suction tube between the air sensor and the butterfly valve;
(ix) a control spring disposed in the second one of the pressure chambers, said control spring acting against the control membrane;
(x) a valve spring disposed in the spring chamber, said valve spring acting against the valve membrane; and
(xi) a transmission pin disposed between the valve membrane and the control membrane.

4,090,488

IGNITION CIRCUIT FOR THE INTERNAL COMBUSTION ENGINE AND PREMATURE IGNITION PREVENTION METHOD IN THE IGNITION DEVICE

Yoshinori Ohki, Tokyo, and Yoshio Kato, Ichikawa, both of Japan, assignors to Iida Denki Kogyo K.K., Tokyo, Japan

Division of Ser. No. 428,833, Dec. 27, 1973, Pat. No. 3,958,546.
This application Dec. 15, 1975, Ser. No. 640,692
Claims priority, application Japan, Dec. 30, 1972, 47-627; Jan. 17, 1973, 48-7513; May 2, 1973, 48-50080; May 17, 1973, 48-58297; May 26, 1973, 48-61707
Int. Cl.² F02P *1/00*
U.S. Cl. 123—148 E **5 Claims**



1. An ignition circuit for an internal combustion engine comprising:
a transformer having a primary winding and a secondary winding;
an electronic switching circuit including a gate terminal connected across said primary winding for controlling the conductivity of said electronic switching circuit to thereby periodically induce a short circuit current in said secondary winding, a trigger circuit including a first silicon controlled rectifier with a gate terminal and a first resistor connected in series across said primary winding,

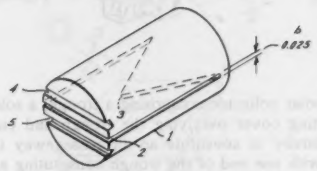
said first resistor connected to the anode of said silicon controlled rectifier;
and an inverse current blocking diode connected in series between a second and a third resistor across said primary winding;
and a common electrical connection between said gate terminal, the cathode of said diode, and one end of said second resistor;
and a capacitor connected in parallel with said second resistor;
whereby firing of said silicon controlled rectifier induces a high voltage in said secondary winding of said transformer.

4,090,489

FRACTURE TOUGHNESS TEST METHOD

Lynn M. Barker, Salt Lake City, Utah, assignor to Reed Tool Company, Houston, Tex.

Division of Ser. No. 718,994, Aug. 30, 1976, abandoned. This application Apr. 20, 1977, Ser. No. 789,319
Int. Cl.[2] B28D *1/04*
U.S. Cl. 125—13 R **3 Claims**



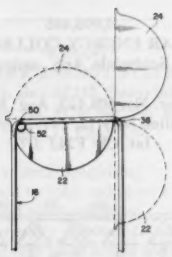
1. A method of preparing a test specimen for fracture toughness testing comprising
selecting a short rod-shaped test specimen of a hard brittle material, and
cutting opposed longitudinal slots in said specimen in a single plane, intersecting said slots to form a single slot and stopping said opposed cutting a point short of the end of said specimen to form an internal V shape.

4,090,490

EASY CLEAN BARBEQUE GRILL

James R. Riley, 3816½ W. 118th Pl., Hawthorne, Calif. 90250, and Sarah M. Riley, Hawthorne, Calif., assignors to James Ross Riley, Hawthorne, Calif.

Filed Feb. 8, 1977, Ser. No. 766,710
Int. Cl.[2] A47J *37/07*; F24B *3/00*
U.S. Cl. 126—25 R **8 Claims**



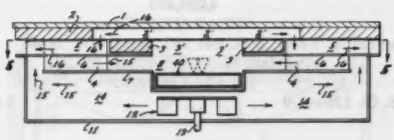
1. A barbeque grill comprising:
a pair of spaced frame members,
a coal-receiving cooking member having a front and rear edge,
a cover member having a front and rear edge,
means pivotably connecting the rear edge of said cover member to the rear edge of said coal-receiving member said pivotably mounting the rear edges of said members between said first and second frame members,
whereby said coal-receiving member may be pivot under its own weight from a substantially horizonal plane to a substantially vertical plane at which position it may be cleaned, and
means between each of said frame members and sad coal-receiving member for locking said coal-receiving member to said frame members with its front and rear edges in a substantially horizontal plane,
whereby food may be cooked on a grill adapted to be supported in a horizontal position in said coal-receiving member.

4,090,491

CERAMIC GLASS BURNER

Earle W. Ballentine, 3641 Via Palomina St., Palos Verdes Estates, Calif. 90274

Continuation-in-part of Ser. No. 727,578, Sep. 28, 1976, abandoned, and Ser. No. 696,793, Jun. 16, 1976, which is a continuation-in-part of Ser. No. 654,113, Feb. 2, 1976, abandoned, which is a continuation-in-part of Ser. No. 518,473, Oct. 29, 1974, abandoned, said Ser. No. 727,578, is a continuation-in-part of Ser. No. 687,663, May 19, 1976, abandoned, and Ser. No. 419,514, Nov. 28, 1973, abandoned, which is a continuation-in-part of Ser. No. 376,405, Jul. 5, 1973, abandoned, which is a continuation-in-part of Ser. No. 250,589, May 5, 1972, abandoned, said Ser. No. 687,663, is a continuation-in-part of Ser. No. 610,564, Sep. 4, 1975, abandoned, which is a continuation-in-part of Ser. No. 512,524, Nov. 7, 1974, abandoned, which is a continuation-in-part of Ser. No. 327,148, Jan. 26, 1973, abandoned. This application May 12, 1977, Ser. No. 796,425
Int. Cl.[2] F24C *3/04*
U.S. Cl. 126—39 J **2 Claims**

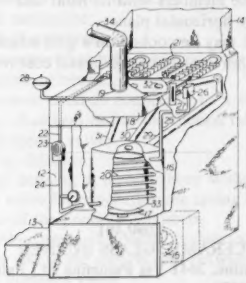


1. A gas burner, comprising:
means defining a first chamber having a flat top and an inlet for fuel gas, the fuel gas flowing in contact with an inside wall of the flat top preheating the fuel gas to a Rankine temperature T_{RG};
aperture means in the flat top arranged in a pattern of two nested hexagons wherein the linear spacing between adjacent apertures of the same hexagon as well as the spacing of any aperture from the closest aperture or apertures in the respective other hexagon is equal to 2.4 times R d_o T_{RG}/T_{RA}, wherein R is the resulting air-gas ratio being equal to or larger than the stoichiometric air-gas ratio but not larger than about 15% of the stoichiometric air-gas ratio, d_o is the aperture diameter and T_{RA} is the Rankine temperature of combustion air being smaller than T_{RG};
a ceramic glass plate above the first chamber means, and heating said flat top by radiation;
means including the first chamber means and the ceramic glass plate to define a mixing chamber above the flat top, and a combustion chamber above the mixing chamber but underneath the ceramic glass plate; and
blower means for forcing air towards the mixing chamber.

4,090,492
FORCED AIR FURNACE WITH LIQUID HEAT EXCHANGER

James E. Simmons, 1420 S. Vermont Ave., Davenport, Iowa 52802

Filed Sep. 27, 1976, Ser. No. 727,285
Int. Cl.[2] F24D 9/00
U.S. Cl. 126—101 2 Claims



1. In a hot air furnace of the type having a firebox, said firebox having a lower portion containing a burner for introducing a flame within said firebox, a draft diverter spaced above said firebox, said firebox having an upper portion with exhaust means connected to said draft diverter, a furnace plenum surrounding said firebox, a hot-air outlet and an air-return duct connected to respective opposite ends of said plenum; a liquid heat exchanger for improving the efficiency of said furnace comprising:

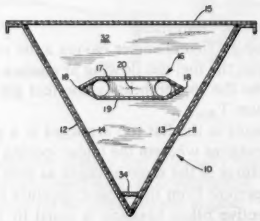
a heating coil comprising a plurality of spaced turns of pipe positioned within said firebox above said burner,

a radiator comprising spaced turns of pipe across said furnace plenum between said firebox and said hot-air outlet, and said heating coil and said radiator being interconnected to form a continuous circulatory system.

4,090,493
SOLAR HEATER

Manfred M. Kneer, P.O. Box 152, Icard, N.C. 28666

Filed Jan. 11, 1977, Ser. No. 758,392
Int. Cl.[2] F24J 3/02
U.S. Cl. 126—270 8 Claims

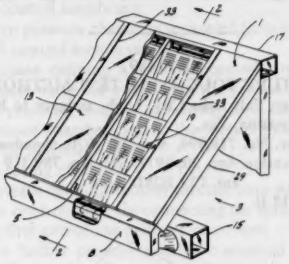


1. A solar heater comprising a fluid conduit and a container, said container having essentially equal dimensional flat transparent and first and second light reflecting sidewalls attached together to form a container having a triangular cross section, at least one segment of said conduit having an enlargement enclosed in said container, the dimension of the transverse axis of said enlargement being no less than one third and no more than one half of the transverse dimension of said transparent sidewall, the surface of the enlargement nearest said transparent sidewall being spaced apart from same by a distance of no less than the dimension of the vertical axis of said enlargement, and the terminal edges of said enlargement nearest said reflective sidewalls being spaced apart therefrom.

4,090,494
SOLAR COLLECTOR

Walter L. Borst; Stephen K. Miller, and Michael B. Kane, all of Carbondale, Ill., assignors to Southern Illinois University Foundation, Carbondale, Ill.

Filed Jan. 24, 1977, Ser. No. 761,619
Int. Cl.[2] F24J 3/02
U.S. Cl. 126—270 14 Claims

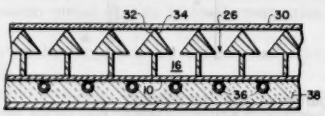


1. A solar collector comprising a trough, a solar radiation transmitting cover overlying the trough and enclosing the latter thereby to constitute an air passageway through the trough with one end of the trough constituting an inlet end, with the other end of the trough constituting an outlet end so that air may flow longitudinally through the trough from the inlet to the outlet end thereof, and solar radiation absorption means disposed in the air passageway in said trough for absorbing solar radiation transmitted through the cover and for heating the air flowing through said trough, said solar radiation absorption means comprising a plurality of louvered panels disposed within said trough, each of said louvered panels extending transversely across the trough and being inclined relative to the longitudinal axis of the trough, each of said louvered panels further having a plurality of louver fins extending from one face of the louvered panels with openings therebetween, each of said louvered fins being generally parallel to the direction of the flow of air through said trough and being disposed to intercept and absorb solar radiation transmitted through said cover whereby said air flows through said louver openings and over said louver fins in a direction generally parallel to said longitudinal axis of said trough for being heated by said louvered panels and by said fins substantially without restriction to the flow of air through said trough.

4,090,495
SOLAR ENERGY COLLECTOR

Israel Arnold Lesk, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 608,423, Aug. 28, 1975, abandoned.
This application May 12, 1977, Ser. No. 796,254
Int. Cl.[2] F24J 3/02
U.S. Cl. 126—270 7 Claims



1. A solar energy collector comprising:

a collector plate having a solar energy absorbing surface;

a first network of transparent or reflective intersecting walls

disposed on said collector plate and forming a plurality of cavities thereon; and

a second network of three-dimensional members disposed on said first network, said three-dimensional members having first reflective surfaces approximately parallel to but spaced from said collector plate, said three-dimensional members further having other reflective surfaces which meet to define a plane parallel to said collector plate, said other surfaces meeting said first surfaces to define apertures in said cavities for admitting incident solar radiation to said cavities.

4,090,496

COMPOUNDS FOR FORMING BODIES FOR GENERATING HEAT FROM RADIANT LUMINOUS ENERGY, AND METHODS OF PREPARATION AND APPLICATIONS THEREOF

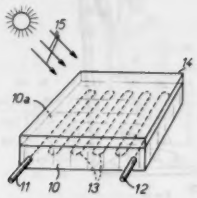
Gilbert Mallet, Crest, France, assignor to Societe Ciulle Particuliere Cominda Engineering, France

Filed Jan. 8, 1976, Ser. No. 647,629

Claims priority, application France, Jan. 17, 1975, 75 01392

Int. Cl.² F24J *3/02*

U.S. Cl. 126—271 **20 Claims**



1. A polymerizable compound suitable for casting or molding bodies for generating heat from radiant luminous energy, particularly but not exclusively from sunlight, comprising a fluid mixture containing 30 to 50% by weight of a transparent resin which can be reticulated by polymerization, and 70 to 50% by weight of an intimate mixture of:

(a) a finely divided absorbent black charge constituting 30 to 60% by weight of the mixture and composed of at least one constituent selected from the group consisting of: graphite and the oxides of iron, copper, manganese, nickel and cobalt, and

(b) a finely divided diffusing white charge constituting 70 to 40% by weight of the mixture and composed of at least one constituent selected from the group consisting of: the alkaline earth carbonates and sulphates and the oxides of silicon, beryllium, magnesium, aluminum, zirconium and thorium.

4,090,497

SOLAR ENERGY SYSTEM

Donald F. Kelly, P.O. Box 62215, Sunnyvale, Calif. 94088

Filed Apr. 28, 1976, Ser. No. 680,913

Int. Cl.² F24J *3/02*

U.S. Cl. 126—271 **34 Claims**

1. A solar energy system comprising:

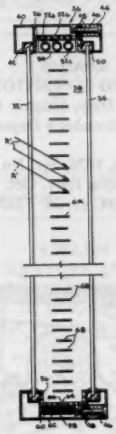
a first panel exposed to solar radiation and at least partially transparent to said solar radiation;

a second panel generally opposed to and at least partially spaced from said first panel and at least partially transparent to solar radiation transmitted through said first panel;

enclosure means interconnecting the edges of said panels whereby a chamber is formed between said panels;

radiation absorbing means in said chamber operative to absorb a first portion of the solar radiation transmitted through said first panel and convert said first portion to sensible heat, and further operative to transmit a second portion of the solar radiation transmitted through said first panel in the form of visible light, said radiation absorbing means comprising a first fluid circulating in said chamber;

heat transfer means comprising a conduit extending through said chamber, said conduit including a section disposed in



the upper portion of said chamber, said section being exposed to the heat of said first fluid, and a second fluid flowing through said conduit and operative to absorb heat from said first fluid via said section of said conduit and carry said heat away from said chamber.

4,090,498

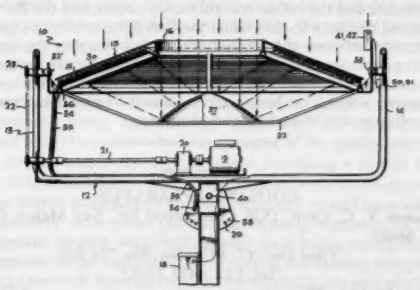
SOLAR HEATER

Phillip D. Benson, 2026 E. Lakeshore Dr., Agoura, Calif. 91301

Filed Sep. 28, 1976, Ser. No. 727,470

Int. Cl.² F24J *3/02*; F03G *7/02*

U.S. Cl. 126—271 **4 Claims**



1. A water heater utilizing solar energy comprising in combination:

a frame;

a conduit for carrying water forming a frusto-conical circular array of coils defining a central opening for conducting solar energy therethrough;

a parabolic mirror coaxial with the axis of said array of coils carried on said frame beneath said array of coils and coaxially disposed with respect to said central opening for receiving the solar energy passing therethrough,

said parabolic mirror having an exposed outer surface effective to redirect the solar energy upwardly against the underside of said array of coils while other solar energy is simultaneously striking the top side of said array of coils;

means for positioning said array of coils to follow the track

of the sun so that the solar energy is perpendicular to said array of coils;

infrared sensors for controlling the positioning means in response to solar energy; and

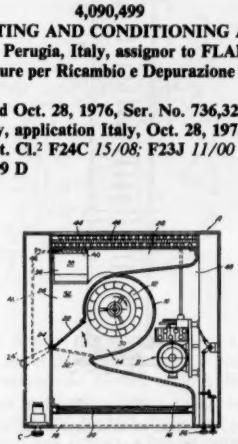
a limit switch disposed at the opposite ends of said array of coils positioning for reversing the direction of travel thereof.

4,090,499

AIR VENTILATING AND CONDITIONING APPARATUS

Abramo Galassi, Perugia, Italy, assignor to FLAMINIA S.p.A. - Apparecchiature per Ricambio e Depurazione Aria, Perugia, Italy

Filed Oct. 28, 1976, Ser. No. 736,320
Claims priority, application Italy, Oct. 28, 1975, 629 A/75
Int. Cl.[2] F24C *15/08*; F23J *11/00*
U.S. Cl. 126—299 D **3 Claims**



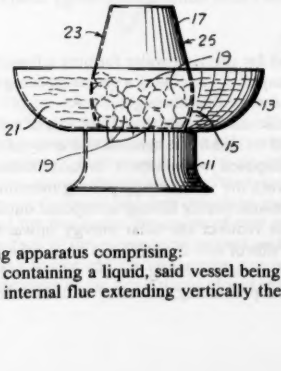
1. Air ventilating and conditioning apparatus for a room comprising a housing, a motor driven fan in said housing, first and second air distributing chambers in said housing, said first chamber communicating with the fan and the room, said second chamber communicating with the fan, the room and the ambient atmospher, first damper means mounted in said housing and movable from a first position blocking communication between the fan and the second chamber to a second position blocking communication between the fan and the first chamber, a second damper means mounted in said housing and movable to open and close communication between the second chamber and the room, control means connecting the first and second dampers so that when the first damper blocks communication between the fan and the second chamber the second damper is closed and when the first damper blocks communication between the fan and the first chamber the second damper is open, air heater means in said first chamber and air cooling means in said second chamber.

4,090,500

COOKING APPARATUS

James T. C. Chen, 1526 Cherrywood Dr., San Mateo, Calif. 94403

Filed Dec. 17, 1976, Ser. No. 751,266
Int. Cl.[2] A47J *37/12*
U.S. Cl. 126—391 **8 Claims**



1. A cooking apparatus comprising:

a vessel for containing a liquid, said vessel being formed to define an internal flue extending vertically therethrough, said flue having an open top and a constriction in the lower portion thereof below the surface of the liquid;

said vessel having a curved bottom extending upwardly toward the constriction in said flue; and

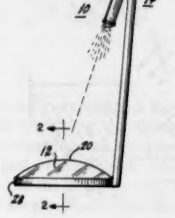
means for heating said vessel, said heating means being disposed beneath said flue in spaced relation to said vessel and having a periphery vertically aligned with the lowermost portion of said curved bottom.

4,090,501

SKIN LESION ANALYZER

Horace Chaitin, 6 Peppermill Rd., Roslyn, N.Y. 11576

Filed Jun. 24, 1976, Ser. No. 699,645
Int. Cl.[2] A61B *5/00*
U.S. Cl. 128—2 H **2 Claims**



1. An apparatus useful for the diagnosis and analysis of skin lesions consisting of a single magnifier for magnifying the image of said skin lesion, said magnifier having a flat bottom surface mounted on a frame, a handle extending upwardly from said frame and having an external light source holding means attached thereto and temperature detection means comprising a cholesteric liquid crystal composition capable of altering color in a predictable manner according to variations in surface body heat, said composition being contained on said flat bottom surface of said magnifier.

4,090,502

REMOTE-CONTROLLED BARIUM INJECTION APPARATUS

Akeo Tajika, Osaka, Japan, assignor to Medical Institute of Hoshokai, Osaka, Japan

Filed May 10, 1976, Ser. No. 684,740
Claims priority, application Japan, Aug. 22, 1975, 50-102371
Int. Cl.[2] A61B *6/02*
U.S. Cl. 128—2 A **5 Claims**

1. A remote-controlled barium injection apparatus comprising:

an anal insertion unit insertable in the anus of a patient, said anal insertion unit having in a leading end portion thereof an air injection port and a separate barium injection and evacuation port;

barium supply system means, connectable to said barium injection and evacuation port, for supplying barium under pressure to said barium injection and evacuation port and therethrough into the intestine and rectal region of a patient;

air supply system means, connectable to said air injection port, for supplying air under pressure to said air injection port and therethrough into the intestine and rectal region of a patient;

barium exhaust system means, connectable to said barium injection and evacuation port, for evacuating barium from

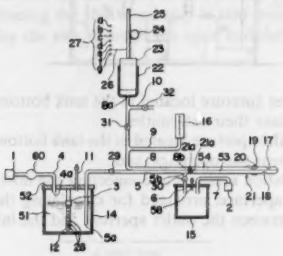
the intestine and rectal region of a patient through said barium injection and evacuation port;

first measurement means, operatively connected to said barium supply system means, for measuring the amount of barium supplied by said barium supply system means to said barium injection and evacuation port;

second measurement means, operatively connected to said air supply system means, for measuring the amount of air supplied by said air supply system means to said air injection port; and

a control panel separately located from the remainder of the apparatus and including:

barium supply actuation means, remotely connected to said barium supply system means, for actuating said barium supply system means and for supplying barium therefrom through said barium injection and evacuation port of said anal insertion unit into the intestine and rectal region of a patient;



first display means, remotely connected to said first measurement means, for displaying values measured by said first measurement means;

air supply actuation means, remotely connected to said air supply system means, for actuating said air supply system means and for supplying air therefrom through said air injection port of said anal insertion unit into and causing inflation of the intestine and rectal region of the patient;

second display means, remotely connected to said second measurement means, for displaying values measured by said second measurement means; and

barium exhaust actuation means, connected to said air supply actuation means and remotely connected to said barium exhaust system means, for actuating said barium exhaust system means and for removing excess barium from the intestine and rectal region of the patient through said barium injection and evacuation port of said anal insertion unit, while again actuating said air supply actuation means and thereby maintaining inflation of the intestine and rectal region of the patient.

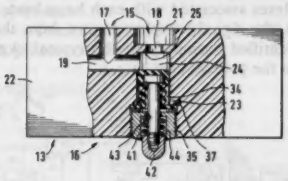
4,090,503

SPHYGMOMANOMETER MEASURING CAPILLARY WITH MERCURY SHUT-OFF DEVICE

Blasius Speidel, Hochmeisterstr. 33, D 7455 Jungingen, Germany

Filed Feb. 11, 1976, Ser. No. 657,248
Int. Cl.[2] A61B *5/02*
U.S. Cl. 128—2.05 G **7 Claims**

1. In a sphygmomanometer including a mercury measuring capillary connected to a mercury storage tank by means of a passageway in said sphygmomanometer, a shut-off device operative selectively to block and open said passageway, comprising: a valve housing including a valve chamber intersecting said passageway; a valve including a valve stem and a locking piece and mounted within said valve chamber for movement between a first position and a second position; and a bellows gasket having a first end affixed to one of said locking piece and said valve stem, and a second end connected to said valve housing, said bellows gasket serving to seal off said valve



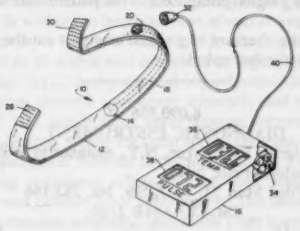
chamber from the remainder of said passageway when said valve is in said first position.

4,090,504

PORTABLE TEMPERATURE AND PULSE MONITOR

Yehuda Nathan, 1717 50th St., Brooklyn, N.Y. 11204

Filed Jun. 21, 1976, Ser. No. 697,851
Int. Cl.[2] A61B *5/02*
U.S. Cl. 128—2.05 R **10 Claims**



1. A medical diagnostic and monitoring apparatus for electronically measuring a patient's internal body temperature and pulse frequency comprising at least two sensing components for respectively detecting a patient's physiological variables of temperature and pulse rate, support means for retaining said sensing components under the patient's arm, the support means including a strap, said strap being adapted to circumscribe the patient's shoulder, yieldable mounting means on said strap for accommodating said sensing components, fastening means for adjustably securing the strap to the patient with the sensing components being anatomically positioned in continuous contact with the patient's body at the apex of the axially space, said contact within the axillary space providing a source of input data detectable by the sensing components, said support means further including a receptacle mounted on said strap and conductively interconnected to said sensing components, a companion display unit, said display unit being selectively connectible to the receptacle for actuating the sensing components to transmit electrical signals corresponding to said physiological variables, and digital logic circuitry within said display unit for processing said signals to provide a visual numeric display.

4,090,505

ELECTROCARDIOGRAPHIC RECORDING METHOD AND MEANS

David W. Mortara, Milwaukee, Wis., assignor to Marquette Electronics, Inc., Milwaukee, Wis.

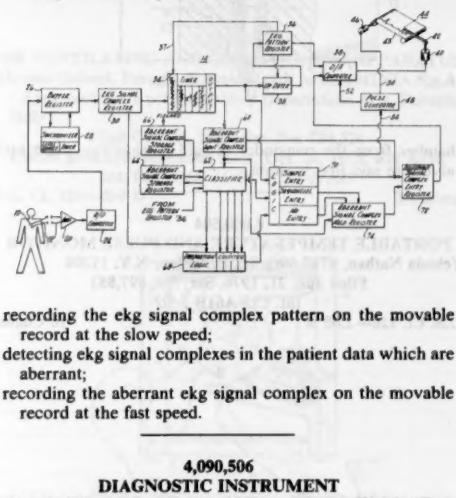
Filed Jun. 1, 1976, Ser. No. 691,536
Int. Cl.[2] A61B *5/04*
U.S. Cl. 128—2.06 G **61 Claims**

1. A method of producing an electrocardiogram on a paper record movable at a slow speed and a fast speed, said electrocardiogram containing the typical and aberrant ekg signal complexes found in the electrocardiographic heart beat data

from the patient, said method reducing the quantity of data so recorded by the elimination of redundancies and comprising:

identifying, in the electrocardiographic patient data, the ekg signal complexes associated with each heart beat;

establishing an ekg signal complex pattern from the complexes so identified exemplifying the typical ekg signal complexes in the patient data;



recording the ekg signal complex pattern on the movable record at the slow speed;

detecting ekg signal complexes in the patient data which are aberrant;

recording the aberrant ekg signal complex on the movable record at the fast speed.

4,090,506

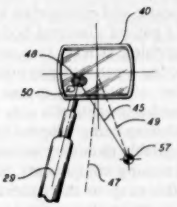
DIAGNOSTIC INSTRUMENT

William S. Pilgrim, Port Byron, N.Y., assignor to Welch Allyn, Inc., Skaneateles Falls, N.Y.

Filed Mar. 31, 1977, Ser. No. 783,166

Int. Cl.[2] A61B *1/06*

U.S. Cl. 128—11 **12 Claims**



1. A laryngoscope or the like for examining a generally inaccessible cavity of a subject having a mirror supported upon an elongated member for insertion and positioning within the cavity, the improvement comprising

a light pipe arranged to bring illumination from a source exterior the subject and direct a beam of light upon a portion of said mirror; and

an aperture passing through the reflecting surface of the mirror and being arranged to pass some of the light incident upon the mirror to illuminate the region behind said mirror.

4,090,507

HYDROTHERAPY TANK

Frederick M. Van Horn, 3414 NE. 143rd Ave., Vancouver, Wash. 98662

Filed Mar. 16, 1977, Ser. No. 778,073

Int. Cl.[2] A61H *9/00*

U.S. Cl. 128—66 **5 Claims**

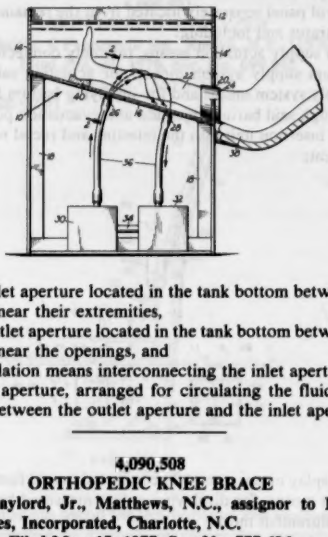
1. A hydrotherapy tank comprising:

(a) a tank shell having opposed sidewalls and opposed end walls interconnected by a bottom, the tank shell being adapted for holding fluid about a user's limbs,

(b) one of the end walls containing paired openings for receiving the limbs of the user,

(c) sealing means joined to the end wall containing the openings and arranged for sealing between the openings and the limbs against water leakage,

(d) the tank bottom sloping upwardly from the end wall containing the openings in a manner for supporting the person's limbs with their extremities in an elevated condition when the limbs are inserted into the sealing means,



(c) an inlet aperture located in the tank bottom between the limbs near their extremities,

(d) an outlet aperture located in the tank bottom between the limbs near the openings, and

(e) circulation means interconnecting the inlet aperture and outlet aperture, arranged for circulating the fluid in the tank between the outlet aperture and the inlet aperture.

4,090,508

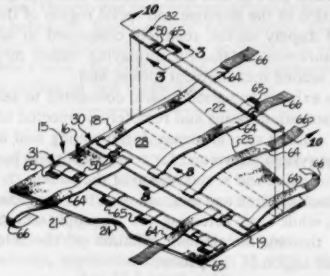
ORTHOPEDIC KNEE BRACE

John F. Gaylord, Jr., Matthews, N.C., assignor to Medical Specialties, Incorporated, Charlotte, N.C.

Filed Mar. 15, 1977, Ser. No. 777,686

Int. Cl.[2] A61F *5/01, 13/06*

U.S. Cl. 128—80 C **19 Claims**



1. An orthopedic knee brace characterized by the ability to be adjusted in both length and circumference so that it may be properly fitted to patients of varying size, and comprising

a sheet of readily severable flexible material having upper and lower end edges and opposite side edges, and being adapted to encircle the knee and adjacent leg portions of the patient,

a rigidifying member having a length to extend substantially between the upper and lower end edges of said sheet and comprising

(a) an elongate encasement comprising an underlying continuous strip, a second strip attached to and overlying substantially the full length of said underlying strip to define a first pocket therebetween which has an open end and a closed end, and a third strip attached to and overlying a substantial portion but not the full length of said second strip to define a non-covered portion of said

second strip and to further define a second pocket between said second and third strips which has an open end and a closed end, and

(b) a relatively rigid stay having a length generally corresponding to the length of said first pocket such that the stay may be inserted and removed through the open end thereof,

means for attaching said rigidifying member to said flexible sheet so as to extend between said end edges of said sheet, and

means for circumferentially binding said sheet in encircling relation about the knee and adjacent leg portions of the patient,

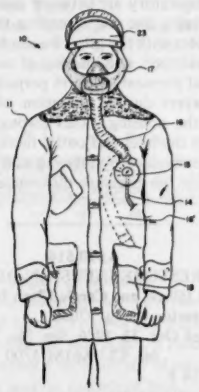
whereby the length of the brace may be shortened by initially removing the stay from said first pocket of said encasement, severing the sheet material and encasement along a line which extends through said non-covered portion of said second strip, shortening the length of said stay to conform to the length of said second pocket, and then positioning the shortened stay in said second pocket by inserting the stay through the open end thereof.

4,090,509

VITAL EMERGENCY SURVIVAL TIME (VEST)

Ronald E. Smith, 1212 Iowa, Ridgecrest, Calif. 93555

Filed Nov. 18, 1976, Ser. No. 743,019
Int. Cl.[2] A62B 7/00
U.S. Cl. 128—142.5 **16 Claims**



1. Apparatus for providing an emergency source of breathing gas to a user, said apparatus comprising:

a garment;

at least one gas storage vessel formed from tubing and attached to said garment;

gas pressure reduction means operably connected to said gas storage vessel;

at least one breathing mask operably connected to said gas pressure reduction means; and

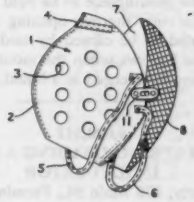
a penetration resistant protective layer attached to said garment and positioned adjacent said gas storage vessel for protecting said user against injury in case of gas storage vessel failure.

4,090,510

FACE MASK WITH EXCHANGEABLE FILTER

Goran Segersten, Orebro, Sweden, assignor to Rebo-Produkter, Orebro, Sweden

Filed Jan. 19, 1977, Ser. No. 760,385
Claims priority, application Sweden, Feb. 5, 1976, 7601232
Int. Cl.[2] A62B 7/10
U.S. Cl. 128—146.6 **1 Claim**



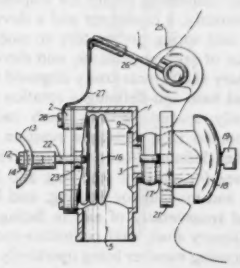
1. A facemask with a filter for intercepting particles of various sizes, comprising a perforated cup-shaped cover member for covering the nose and mouth of a user, an outside filter layer made of filter material for filtering coarse particles and shaped to fit within the inside surface of said cover member, an inside filter layer made of material for filtering fine particles and shaped to fit within said outside filter layer, said inside and outside filter layers being secured to each other at an intermediate location thereof, said cover member, said outside filter layer, and said inside filter layer having approximatery the same surface area, means for securing said facemask to the face of a user, said cover member including fastening means secured at opposing peripheral edges thereof, said fastening means clamping said outside filter layer against the inside surface of said cover member whereby, said inside filter layer covers said fastening means and protects the face of the user against contact thereof.

4,090,511

MOUTHPIECE VALVE FOR ESCAPE BREATHING APPARATUS

Robert Elder Gray, Pittsburgh, Pa., assignor to Mine Safety Appliances Company, Pittsburgh, Pa.

Filed Mar. 23, 1977, Ser. No. 780,409
Int. Cl.[2] A62B 7/00
U.S. Cl. 128—147 **6 Claims**



1. A mouthpiece valve for escape breathing apparatus, comprising a tubular valve housing provided in one side with a mouth port and in its opposite side with a vent opening, the housing also having between said port and vent opening an opening for connection to a carbon dioxide removing and oxygen generating canister, a valve seat inside the housing around said port, a valve member in the housing, a spring urging the valve member toward said seat to normally close the valve, a bellows surrounding said valve member and spring

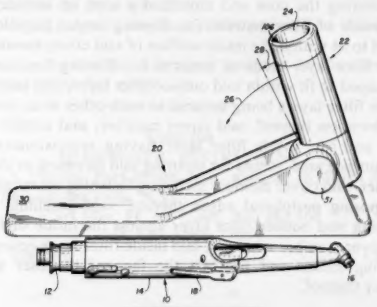
and having an open end secured to said housing around said vent opening to thereby continually expose the inside of the bellows to the pressure of liquid in which the valve may be submerged, a mouthpiece connected to the outer end of said port and adapted to be held in the mouth of a user, a ring slidably mounted on said valve housing adjacent the mouthpiece, and means connecting said valve member with the ring for movement therewith, such that the ring is positioned adjacent the mouthpiece and must be moved toward the housing in order to permit the mouthpiece to be held in the mouth with the lips behind the ring, thereby opening the valve, and the valve being adapted to be closed by said spring and liquid pressure inside the bellows when the mouthpiece is removed from the mouth and submerged in a liquid.

4,090,512

DEVICE FOR SPRING-LOADING A NEEDLELESS INNOCULATOR

Norman R. Doherty, 870 Main St., Farmingdale, N.Y. 11735, and Richard F. Doherty, 61 Lion La., Westbury, N.Y. 11590

Filed Sep. 2, 1976, Ser. No. 719,733
Int. Cl.[2] A61M *5/30*
U.S. Cl. 128—173 H **5 Claims**



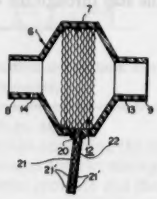
1. In combination, a needleless innoculator of the type having an elongated external housing including medication dispensing means disposed at one end and an inner core slidably mounted within said housing and depending externally from the other end of said housing, spring means biasing said core towards said one end, means associated between said core and said medication dispensing means for dispensing the medicament subcutaneously, a connector and a device for mechanically loading said spring preparatory to said medication-dispensing service of said innoculator, said device comprising a base, a stationary shaft transversely disposed to the longitudinal axis of said base and defining a rotation axis and having circumferentially spaced holding teeth radially extending therefrom mounted in a clearance position on said base, a housing member defining a connector-receiving compartment including means for slidably receiving and holding said depending core and innoculator housing, said housing member being oriented transversely of and in facing communication with said stationary shaft, said connector-receiving compartment of said housing member being opertively mounted on said shaft in a pivotal traverse eccentric relation about said stationary shaft, said connector having an operative inserted position within said connector-receiving compartment, said connector having a depending end with lateral teeth egaging means projecting therefrom for establishing meshing engagement with said holding teeth of said stationary shaft during said pivotal traverse thereof, the opposite end of said connector including said means for receiving and holding said core defining an opening therein, said inner core depending end being slidably inserted and removable within said opening, and innoculator core gripping means circumferentially spaced about said opening movable from a starting position radially inward for establishing gripping contact with said depending inner core only after initial angular movement of said connector through said pivotal traverse thereof, whereby said depending innoculator inner core end is readily inserted and removed from said device in the absence of established gripping contact therewith during said initial angular movement but otherwise is held by said established gripping contact for the loading of said spring means during the balance of the angular movement of said pivotal traverse.

4,090,513

HEAT AND MOISTURE EXCHANGING DEVICE FOR RESPIRATION

Tatsuo Togawa, Funabashi, Japan, assignor to Termuo Corporation, Tokyo, Japan

Filed Mar. 18, 1976, Ser. No. 667,988
Claims priority, application Japan, Mar. 20, 1975, 50-37858[U]
Int. Cl.[2] A61M *16/00*
U.S. Cl. 128—212 **4 Claims**



1. A heat and moisture exchange device for respiration comprising a housing having an inlet adapted for detachable connection to a trachael cannula and an outlet adapted for detachable connection to a tube for passing respiratory air, permeable heat and moisture exchange layers disposed between said inlet and said outlet substantially normal to the axis of passage of respiratory air between said inlet and outlet, a drainage tube having one end extending through said housing adjacent said layers with the other free end being open for flow of fluid out of said tube, said one end of said tube opening into contact with said permeable layers permitting liquid accumulated by said layers during operation of said device to be drained out of the housing, holes through the walls of said housing adjacent the inlet and outlet thereof and a differential pressure gauge connected by tubes to said holes to permit said gauge to measure the pressure difference between said inlet and said outlet.

4,090,514

PRESSURE INFUSION DEVICE

Howard Helmut Hinck, and Carole Clark Hinck, both of Rte. 2, Box 710, Beaverton, Oreg. 97005

Filed Oct. 22, 1976, Ser. No. 734,957
Int. Cl.[2] A61M *5/00*
U.S. Cl. 128—214 F **5 Claims**

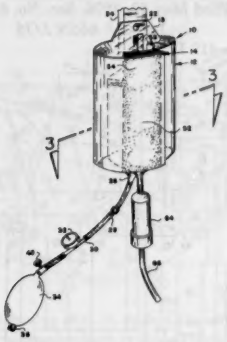
1. A pressure infusion device for infusing liquid by the application of pressure from a liquid-filled flexible bag into a patient, comprising:

a laminated member including a central section and end sections on each side thereof, said central section being sealed along its top, bottom and sides thereby defining a bladder section, said laminated member normally assuming a substantially flat open position so that a liquid-filled flexible bag can be positioned along an inside surface of said bladder section;

fastening means on said inside surface of said bladder section for supporting and maintaining the liquid-filled flexible bag in position along said bladder section;

securing means on said end sections, said securing means extending substantially the entire length of said end sec-

tions for securing said end sections together in engagement so that said bladder section surrounds substantially all of the liquid-filled flexible bag and said laminated member completely encompasses the liquid-filled flexible bag; and



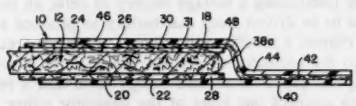
pumping and valve means connected to said bladder section for pumping fluid into said bladder section so that said bladder section applies pressure substantially throughout the liquid-filled flexible bag to infuse liquid therefrom into a patient.

4,090,515

DISPOSABLE DIAPER WITH WAIST FLUID BARRIER

Hamzeh Karami, Crystal Lake, Ill., assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 634,578, Nov. 24, 1975, abandoned. This application Feb. 1, 1977, Ser. No. 764,611
Int. Cl.[2] A61F *13/16*
U.S. Cl. 128—284 7 Claims



1. A disposable diaper, comprising:

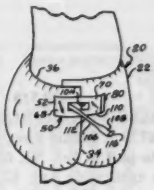
an absorbent pad assembly having a pair of side edges, an absorbent pad having a pair of side edges and a pair of end edges connecting the side edges, a fluid impervious backing sheet covering a back surface of said pad and having at least one end section extending past one end edge of the pad and defining an end edge of the pad assembly, with said end section extending between side edges of the pad assembly, said pad assembly having a fluid pervious top sheet covering a front surface of the pad, and a separate segment of fluid impervious material overlying said end section of the backing sheet and extending substantially between the side edges of the pad assembly, said segment extending inwardly from the end edge of the pad assembly toward the longitudinal center of the diaper and overlying an end portion of the top sheet and pad adjacent said one end edge of the pad to prevent fluid leakage from the end of the pad, said segment being secured to the underlying portion of the pad assembly substantially throughout the lateral and longitudinal dimensions of the segment.

4,090,516

DIAPER WITH ELASTIC FASTENER TAB

Charles H. Schaar, Lake Zurich, Ill., assignor to Colgate-Palmolive Company, New York, N.Y.

Division of Ser. No. 756,309, Jan. 3, 1977. This application Sep. 23, 1977, Ser. No. 836,162
Int. Cl.[2] A61F *13/16*
U.S. Cl. 128—287 4 Claims



1. A disposable diaper, comprising:

an absorbent pad assembly having opposed surfaces; and

a tape fastener comprising,

a first tape strip having a first portion attached to one of said surfaces of the pad assembly, a securement portion for securing the diaper about an infant, and a cut-out intermediate said first and securement portions, and

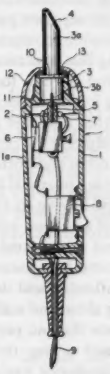
a second tape strip extending through the cut-out of said first tape strip and having a securement portion for attachment to the diaper and an elastic portion between the securement portion of the second tape strip and the diaper.

4,090,517

MEDICAL APPLIANCE

Nagatoki Takenaka, 10-14, 1-chome, Shiba-Kubo-cho, Tanashi-shi, Tokyo-To, Japan (188)

Filed Oct. 27, 1976, Ser. No. 736,086
Claims priority, application Japan, Jul. 1, 1976, 51-87053
Int. Cl.[2] A61B *17/36*
U.S. Cl. 128—303.1 7 Claims



1. In a medical appliance, a housing having a longitudinal axis and shaped for convenient hand grip, there being an opening disposed in a first end thereof, concentric of said axis, electric heating means within said housing, circuit means for energizing said heating means and including a temperature control therefor, a heat-conducting plate in said housing in heat exchange relation with said heating means and having a part projecting toward and contiguous to said opening, a presser element secured to said housing and having a first portion in contact with the projecting part of said plate and a second portion projecting forwardly through said opening,

and first means releasably securing said presser element centrally of and within said opening to obturate the same, said second portion being shaped to contact and treat a selected part of the human body.

4,090,518

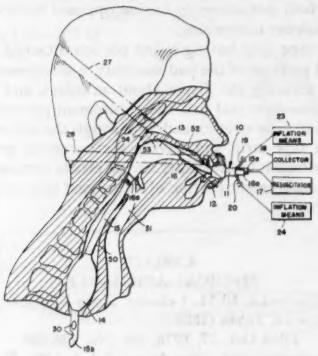
ESOPHAGO-PHARYNGEAL AIRWAY

James O. Elam, 6723 S. Euclid Ave., Chicago, Ill. 60649

Continuation-in-part of Ser. No. 607,267, Aug. 25, 1975, abandoned. This application Aug. 12, 1976, Ser. No. 713,904

Int. Cl.[2] A61M *16/00*

U.S. Cl. 128—349 B **39 Claims**



1. An esophago-pharyngeal airway device adapted for insertion through the mouth and into the esophagus of an unconscious patient to provide separate passages for stomach drainage and artificial respiration, comprising an elongated flexible tube assembly including first tube means having a proximal end portion and a distal end portion for extending through said mouth and terminating in the stomach of a patient, and second tube means separate from said first tube means and having a proximal end portion adjacent the proximal end portion of said first tube means and a distal end portion for extending through the mouth and terminating proximal to the distal end portion of said first tube means and having an air flow port proximate the entrance of a trachea of a patient, said first tube means being a stomach drain tube and said second tube means being an air tube; said first and second tube means being disposed in close parallel relation; an inflatable and deflatable tubular oral balloon meeans extending about and sealed to said first and second tube means intermediate the end portions of said second tube means for engaging and urging the soft palate into sealing engagement with the posterior nasopharyngeal wall of a patient following insertion of said device and inflation of said oral balloon means; means for inflating and deflating said oral balloon means; an inflatable and deflatable tubular esophageal balloon means spaced distally from said distal end of said air tube and extending about and sealed to said drain tube for sealingly engaging upon inflation thereof, the wall of a patient's esophagus below the entrance to the trachea and above the stomach to prevent aspiration or refluxed stomach contents; said second tube means extending distally of said esophageal balloon means and terminating in at least one drainage-receiving opening at its distal end; and means for inflating and deflating said esophageal balloon.

4,090,519

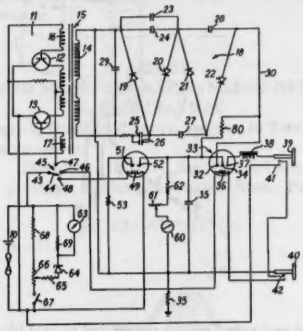
DEFIBRILLATORS

James Francis Pantridge, Colin House, Dunmurry (Co. Antrim), and John Anderson, 38 Ardmore Rd., Holywood (Co. Down), both of Northern Ireland

Filed May 10, 1976, Ser. No. 684,885

Int. Cl.[2] A61N *1/36*

U.S. Cl. 128—419 D **5 Claims**



1. A defibrillator apparatus comprising a capacitor, charging means including a direct current source arranged to charge the capacitor to a given energy level, an inductance, and a pair of electrodes for connection by switching means to said capacitor, one by way of said inductance, whereby the capacitor may be discharged through a patient by means of the electrodes to inflict an electric shock on that patient, the selection of the energy level, the capacitor and the inductance being such that the voltage wave-form, across the electrodes, of the discharge pulse has a duration of between ten and sixteen milliseconds, a peak value of not more than four kilovolts and a minimum rise time to that peak of one thousand microseconds when the electrodes are connected across a load resistance of between 50 and 75 ohms representative of a patient, said rise time being not less than one thousand one hundred microseconds, said capacitor having a capacitance value of fifty microfarads, said inductance having an inductance value of 50 millihenries and an ohmic resistance value of 18 ohms, said means for charging the capacitor comprising a storage battery of cells, an oscillator arranged to be driven from that battery to produce an A.C. voltage output, a rectifier and voltage multiplier circuit connected to the oscillator to produce the required voltage for charging the capacitor to said energy level and a relay arranged to connect one plate of the capacitor either to said voltage multiplier circuit or to one of said electrodes, and wherein when said one plate of the capacitor is connected to said one of the electrodes, the voltage multiplier circuit is also connected to that electrode by way of a series resistor.

4,090,520

METHOD OF AND APPARATUS FOR ADHERING SHEET MATERIAL WRAPPINGS AND THE LIKE

Donald B. McIntyre, and Frederic S. McIntyre, both of Wellesley Hills, Mass., assignors to Acumeter Laboratories, Inc., Newton Lower, Mass.

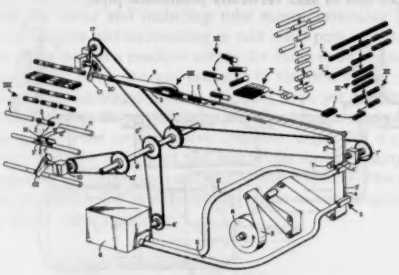
Filed Dec. 15, 1976, Ser. No. 750,840

Int. Cl.[2] A24C *1/32, 5/48*

U.S. Cl. 131—29 **10 Claims**

1. A method of wrapping substantially cylindrical inserts within sheet material, that comprises, forming the inserts and feeding the same along a line; feeding a web of the sheet material in the direction of said line to receive the inserts longitudinally thereupon; depositing upon the web prior to its receiving the inserts a longitudinal adhesive line near an edge of the web and successive sets of longitudinally spaced transversely extending adhesive dots or dashes; controlling the longitudinal

spacing between said sets of transversely extending adhesive dots or dashes to corrrespond to predetermined spaced regions along said inserts; transversely wrapping the adhesive-provided web about the inserts with sufficient overlap to enable securing along said longitudinal adhesive line and to adhere the



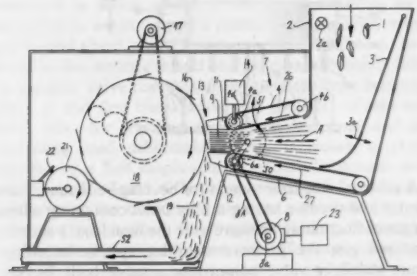
successive sets of adhesive dots or dashes circumferentially to the inserts at said predetermined regions thereof; and transversely cutting said wrapped inserts synchronously with the presentation of spaces between said sets of adhesive dots or dashes to avoid cutting contact with the same.

4,090,521

METHOD AND APPARATUS FOR COMMINUTING TOBACCO OR THE LIKE

Uwe Elsner, Dassendorf, Germany, assignor to Hauni-Werke Korber & Co. KG, Hamburg, Germany

Filed Dec. 6, 1976, Ser. No. 747,507
Claims priority, application Germany, Dec. 19, 1975, 2557313
Int. Cl.[2] A24B *1/02;* B02C *4/32*
U.S. Cl. 131—109 R **11 Claims**



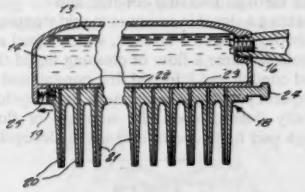
1. In an apparatus for comminution of fibrous material, particularly in a tobacco shredding apparatus, a combination comprising a source of fibrous material; comminuting means spaced apart from said source; feeding means including conveyor means movable in a first direction to advance fibrous material from said source into the range of said comminuting means and in a second direction to withdraw the material from said range; means for moving said conveyor means in said first direction; and control means including means for deactivating said moving means and means for effecting the movement of said conveyor means in said second direction in response to deactivation of said moving means.

4,090,522

MEDICATED COMB FOR DANDRUFF AND OTHER HAIR AND SCALP DISEASES

Virgil L. Donley, c/o George Spector, 3615 Woolworth Bldg., 233 Broadway, and George Spector, 3615 Woolworth Bldg., 233 Broadway, both of, New York, N.Y. 10007

Filed Jan. 14, 1976, Ser. No. 649,134
Int. Cl.[2] A45D *24/22*
U.S. Cl. 132—112 **2 Claims**



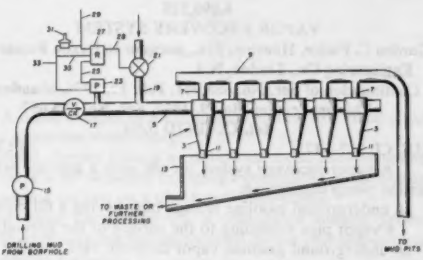
1. In a fluid dispensing comb, a comb backbone having an interior chamber containing dispensing liquid, having a hollow handle removably mounted on one end of said backbone forming a filler cap for said chamber with a longitudinal groove along a lower wall of said backbone, in combination with a tooth unit mounted slidably in said groove for longitudinal motion, said tooth unit having a row of hollow teeth each having a central opening therethrough, a push button projection on one end of said tooth unit, a compression coil spring adjacent an opposite end of said tooth unit bearing against said backbone and unit, openings through said backbone lower bottom wall so as to align said teeth openings with said lower wall openings when said push button projection is pushed to longitudinally slide said tooth unit relative to said backbone, said spring normally retaining the said unit in a position wherein said openings are not aligned, wherein a side wall of said backbone has a set of sideward massaging fingers, wherein an extension is integral with said tooth unit and extends through a slot of said bottom wall into said chamber, a row of fins formed on said extension each extending between two bumps on a side wall of said backbone, an end of said fins being slitted to form brushes that brush across said openings of said backbone lower bottom wall.

4,090,523

SYSTEM FOR AUTOMATICALLY FLUSHING HYDROCYCLONES USED IN DRILLING MUD TREATMENT

John Kelly, Jr., Arlington, and Wilbur F. Roper, Dallas, both of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Oct. 14, 1976, Ser. No. 732,240
Int. Cl.[2] B08B *3/00*
U.S. Cl. 134—18 **9 Claims**



1. In a method of treating a drilling mud to remove drilled solids therefrom wherein the drilling mud is flowed through a first conduit and into a hydrocyclone and there treated to

remove the drilled solids, the method of automatically flushing the hydrocyclone upon stopping flow of mud thereto comprising:

(a) installing a check valve in said first conduit to permit flow of mud through said first conduit only in the direction toward said hydrocyclone;

(b) locating a second conduit to communicate with said first conduit downstream of said check valve;

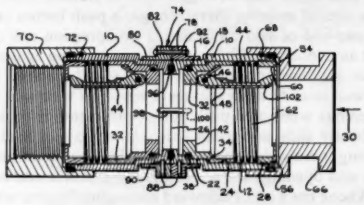
(c) sensing the flow of mud through said first conduit downstream of said check valve to detect the stopping of flow of mud through said first conduit; and

(d) generating a signal in response to said stopping of flow of mud through said first conduit, which signal activates for a preselected time a flow of cleaning liquid through said second conduit and into said first conduit and thence into said hydrocyclone, whereby said hydrocyclone is automatically flushed upon the stopping of flow of mud through said first conduit into said hydrocyclone.

4,090,524
FRANGIBLE VALVED FITTING

Alan R. Allread, Jackson, and Kenneth A. Levering, Jerome, both of Mich., assignors to Aeroquip Corporation, Jackson, Mich.

Filed Feb. 11, 1974, Ser. No. 441,242
Int. Cl.[2] F16K *17/36, 17/40*
U.S. Cl. 137—68 R **30 Claims**



1. A frangible valved fitting comprising, in combination, a valve body having a passage defined therein defining a flow path and having an inlet and an outlet, frangible means connecting said valved body to conduit means, a flapper valve within said passage pivotally mounted within said body upon a pivot axis transversely disposed to said passage for movement between open and closed positions, valve seat means defined within said passage cooperating with said flapper valve when in said closed position to close said passage, valve retaining means within said passage releasably retaining said flapper valve in said open position, and flapper valve operating means sensing connection of said body to said conduit means and controlling operation of said retaining means permitting said retaining means to release said flapper valve to close said passage upon fracturing of said frangible means.

4,090,525
VAPOR RECOVERY SYSTEM

Gordon C. Potter, Houston, Tex., assignor to Exxon Research & Engineering Co., Linden, N.J.

Continuation of Ser. No. 658,941, Feb. 17, 1976, abandoned. This application May 9, 1977, Ser. No. 795,057
Int. Cl.[2] B67D *5/04*
U.S. Cl. 137—171 **6 Claims**

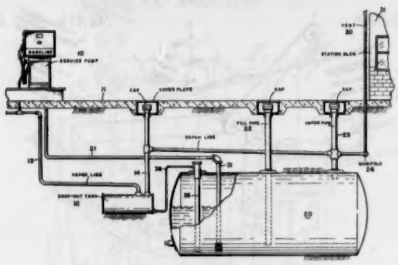
1. A vapor recovery system for use with a gasoline service station pump comprising:

an underground gasoline storage tank having a fill pipe and a vapor pipe extending to the surface of the ground;

an underground gasoline vapor drop-out tank, smaller than said storage tank, located adjacent said storage tank and having a vapor line extending to said service station pump and a vapor pipe extending to said surface and connected to said storage tank vapor pipe;

a vent means, both of said vapor pipes connecting to said vent means; a vertically positioned pipe having an open lower end and a closed upper end extending to said storage tank from the top thereof to adjacent the bottom thereof;

a tube connecting the lower end of said drop-out tank to the upper end of said vertically positioned pipe;

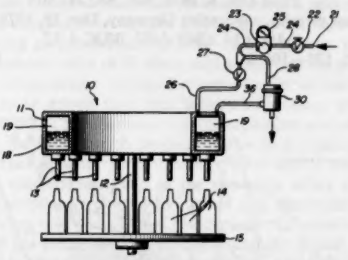


the arrangement of said drop-out tank, said storage tank, said tube and said vertically positioned pipe being such that when the level of liquid in the underground storage tank has dropped sufficiently, a vacuum higher than the lift in said tube is created and flow of liquid will commence from the drop-out tank through said tube and continue until said drop-out tank is empty without further lowering of the level of liquid in said underground storage tank.

4,090,526
GAS PRESSURE STABILIZER SYSTEM AND VALVE

Chester J. Witt, Chicago, and Richard M. Thompson, Schiller Park, both of Ill., assignors to Mojonnier Bros. Co., Chicago, Ill.

Continuation of Ser. No. 565,522, Apr. 7, 1975, abandoned. This application Aug. 16, 1976, Ser. No. 714,906
Int. Cl.[2] B67D *5/34*
U.S. Cl. 137—209 **6 Claims**



1. A pressure stabilizer system for beverage container filling apparatus and the like having a filler bowl containing a liquid and a gas of fluctuating pressure over the liquid and a source of pressurized gas; the pressure stabilizer system including a pressure stabilizer valve comprising a valve body having a hollow interior, a diaphragm extending across the valve body interior and dividing the interior into at least two chambers, first port means in the valve body permitting pressurized gas flow between the gas pressure source and a first valve chamber, a one-way conduit connected to the pressure source and to the bowl and permitting the flow of gas from the gas pressure source to the bowl without passing through the stabilizer valve body, a check valve located in the one-way conduit between the bowl on one hand and the pressure source and pressure stabilizer valve on the other hand for checking gas flow from the bowl to the valve body first chamber and checking gas flow from the bowl directly to the source so as to isolate the stabilizer valve body and diaphragm from rapid pressure fluc-

tuations to permit quiet sensitive valve operation, second port means in the valve body, and a two-way conduit connected to the second port means and to the filler bowl for permitting gas flow between the filler bowl and a second valve chamber, pressure relief means having a relief port permitting gas flow between the second valve chamber and the environment outside the valve and including tube means extending into the body interior and terminating in said relief port so as to locate the relief port at a position within the valve to be sealed by the diaphragm when the gas pressure in the first valve chamber urges the diaphragm toward the relief port, yet permitting the relief port to be unsealed by the diaphragm when the gas pressure in the second valve chamber urges the diaphragm away from the relief port and diaphragm spring biasing means engaging the diaphragm and urging the diaphragm away from the pressure relief port to further assist in encouraging quiet, sensitive valve operation.

4,090,527

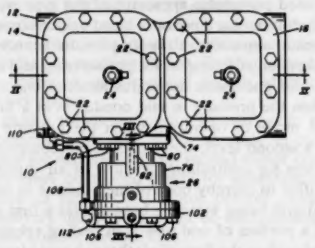
BACKFLOW PREVENTER AND RELIEF VALVE ASSEMBLY

Ray Sutherland, Hopwood, Pa., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Division of Ser. No. 668,627, Mar. 19, 1976, Pat. No. 3,996,962. This application Jul. 19, 1976, Ser. No. 706,350

Int. Cl.[2] E03B *7/07*

U.S. Cl. 137—215 **2 Claims**



1. A backflow prevention assembly adapted to be connected between a supply main and a service pipe, comprising; a first check valve and a second check valve, said check valves being connected in series, said first check valve having an inlet adapted to be subjected to the pressure in said supply main and said second check valve having an outlet adapted to be subjected to the pressure in said service pipe; a pressure differential operable valve communicating with the zone between the outlet of said first check valve and the inlet of said second check valve for effecting draining of said zone; and means controlling said differential valve, including a chamber bounded by a first diaphragm, a second diaphragm, and by housing walls of said differential valve, said first diaphragm responsive to the differential pressure across said first check valve, and said second diaphragm providing balancing and supplementary closing force on said differential valve by passage means connecting said chamber and said zone.

4,090,528

TRUSS ASSEMBLY STRUCTURE

Kenneth J. Hegemann, Ewa Beach, Hi., assignor to Rainmatic International, Ltd., Honolulu, Hi.

Filed Mar. 16, 1977, Ser. No. 778,068

Int. Cl.[2] B05B *3/12*

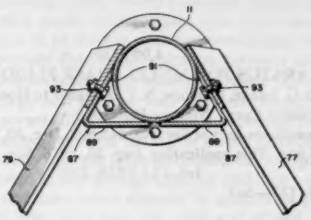
U.S. Cl. 137—344 **4 Claims**

1. Improved apparatus in a center pivot irrigation system for supporting a pipeline between adjacent tower assemblies adapted to transport the pipeline over uneven terrain, the improved apparatus comprising:

a pair of support members extending between the tower assemblies;

a triangularly-shaped truss including a generally horizontal bottom member coupled to and extending between the support members and further including first and second side members coupled to the bottom member and slanting inwardly and upwardly to the pipeline; and

means for coupling the truss side members to the pipeline, the coupling means including horizontal member means attached to the pipeline on the underside thereof and extending outwardly in opposite directions beyond the pipeline and further including side members having one



end coupled to and integral with a corresponding outwardly extending end of the horizontal member means, each of the coupling side members having another end attached to the pipeline on opposite sides thereof,

the coupling means including means for fastening the truss side members to the corresponding coupling side members, each of the truss side members extending beyond the end of the corresponding coupling side member to contact the pipeline, the coupling means establishing a flucrum at a corresponding intermediate point along the length of each of the truss side members to equalize the forces applied to the truss members as the pipeline is transported over uneven terrain.

4,090,529

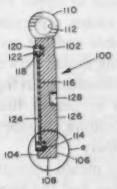
CLAPPER SEAL FOR CHECK VALVES

Ronald A. Schuller, 3634 S. Sandusky, Tulsa, Okla. 74135, and Robert J. Glahn, 8527 E. 25th St., Apt. #1, Tulsa, Okla. 74129

Filed Dec. 13, 1976, Ser. No. 749,924

Int. Cl.[2] F16K *15/03*

U.S. Cl. 137—516.29 **6 Claims**



1. A metal clapper to prevent reverse flow in a metal check valve apparatus, comprising:

a metal clapper having a continuous metal annular sealing surface for sealingly engaging a continuous metal annular sealing surface on a check valve apparatus;

said metal clapper having a continuous annular groove therein adjacent and surrounded by the continuous metal sealing surface;

a continuous web of resilient material bonded to the clapper within the space surrounded by the continuous metal annular sealing surface and extending into the annular groove to prevent any leakage around the annular groove;

said central web being recessed from said annular sealing surface of said clapper;

said central web having a raised annular seal formed of said resilient material and extending from said groove past the clapper annular sealing surface and deformably engageable with a check valve sealing surface upon engagement of the two metal sealing surfaces to prevent leakage around the annular groove and flow through the check valve apparatus in one direction.

4,090,530

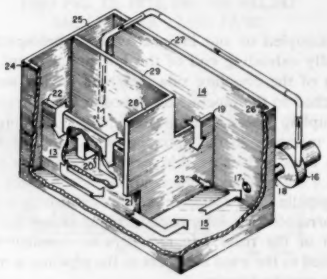
APPARATUS FOR MULTI-PHASE FLUID SYSTEMS

Norbert G. Lange, Sanborn, N.Y., assignor to Hooker Chemicals & Plastics Corp., Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 645,509, Dec. 30, 1975, Pat. No. 3,987,816. This application Aug. 30, 1976, Ser. No. 719,002

Int. Cl.[2] F03B *7/07*

U.S. Cl. 137—563 **8 Claims**



1. An apparatus for a multi-phase fluid system having an upper phase fluid and a lower phase fluid wherein, in a static condition the upper phase fluid covers the upper surface of the lower phase fluid and in an operating condition the upper phase fluid is removed from a pre-selected portion thereof; said apparatus comprising:

(a) a working chamber;

(b) an overflow receiving chamber;

(c) a holding chamber;

(d) a pumping chamber; each of said chambers having a lower region and an upper region;

(e) a first weir means separating the lower region of the working chamber and the receiving chamber;

(f) a first separating means between the holding chamber and the working chamber having an opening in the lower region thereof to permit fluid flow between the lower region of the holding chamber and the lower region of the working chamber;

(g) a second weir means separating the lower region of the holding chamber and the pumping chamber;

(h) a second separating means between the receiving chamber and the pumping chamber having an opening in the lower region to permit fluid flow between the lower region of the receiving chamber and the lower region of the pumping chamber;

(i) a pumping means having an inlet side in fluid communication with the lower region of the pumping chamber and an outlet side in fluid communication with the lower region of holding chamber;

(j) an equalizing means providing fluid communication from the lower region of holding chamber to the lower region of the pumping chamber.

4,090,531

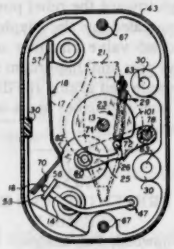
PNEUMATIC CONTROL DEVICE

Lawrence J. Laviana, Kensington, Conn., assignor to M.H. Rhodes, Inc., Avon, Conn.

Filed Jul. 22, 1976, Ser. No. 707,482

Int. Cl.[2] G05D *16/00*

U.S. Cl. 137—624.12 **5 Claims**



1. In a pneumatic control device for controlling the operation of associated pneumatic apparatus of the type wherein a pneumatic conduit having a pressure bleed orifice is connected to said pneumatic apparatus, a supply pressure source is connected to said pneumatic conduit for pressurizing said conduit, and wherein said pneumatic apparatus assumes one mode of operation when the pressure in said conduit is at a first level and a second mode of operation when the pressure in said conduit is at a second level, the improvement comprising:

a venting arm for controlling the flow of air through said bleed orifice to thereby control the pressure in said conduit, said arm being movable between (a) a first position wherein a portion of said arm is in sealing relation with said bleed orifice, the flow of air through said bleed orifice is restricted and said conduit is pressurized to one of said first and second levels; and (b) a second position in which said arm is in spaced relation from said bleed orifice, the flow of air through said bleed orifice is substantially unrestricted and said conduit is pressurized to the other of said first and second levels;

timing means, means for activating said timing means for a preselected time interval and means for deactivating said timing means said preselected time interval after activation thereof;

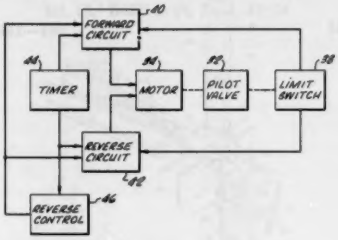
a manually rotatable shaft operatively connected to said timing means activating means, rotation of said shaft in one direction away from an initial position effecting operation of said activating means to activate said timing means for a preselected time interval dependent on the angle through which said shaft is rotated, said shaft also being operatively connected to said deactivating means, said deactivating means returning said shaft to said initial position upon expiration of said preselected time interval; and

control means operatively connected to said shaft for movement between a first position upon rotation of said shaft in one direction, and a second position upon return of said shaft to said initial position, said control means effecting movement of said arm to one of said first and second arm positions when said control means is in one of said first and second positions and for effecting movement of said arm to the other of said first and second arm positions when said control means is in the other of said first and second positions.

4,090,532
TIMER CONTROLLED VALVE

J. Albert Story, Jr., La Puente, Calif., assignor to Cla-Val Co., Costa Mesa, Calif.

Filed Dec. 6, 1976, Ser. No. 747,532
Int. Cl.[2] G05G *21/00*
U.S. Cl. 137—624.15 23 Claims



1. A timed controller comprising

a valve body having a plurality of ports, a valve spool mounted in said body for motion between a first position in which the spool interconnects a first pair of said ports and a second position in which the spool interconnects a second pair of said ports,

a reversible motor connected to drive said valve spool between said first and second positions,

first and second motor control circuits for driving said motor in first and second directions respectively and each including an enabling switch, first timer controlled means for operating said enabling switch of said first motor control circuit,

limit switch means responsive to said valve spool for de-energizing said first motor control circuit, reversing means for establishing said second motor control circuit,

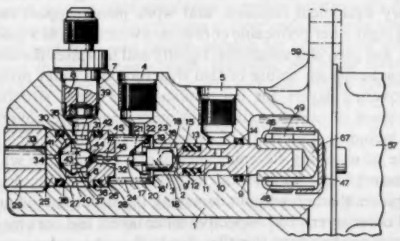
second timer controlled means for operating said enabling switch of said second motor control circuit at a time selectively delayed from the de-energization of said first motor control circuit, and

limit switch means responsive to said valve spool for de-energizing said second motor control circuit.

4,090,533
FLUID VALVE ASSEMBLIES

David Anthony Harries, Solihull, England, assignor to Girling Limited, Birmingham, England

Continuation of Ser. No. 586,604, Jun. 13, 1975, abandoned.
This application Dec. 9, 1976, Ser. No. 749,076
Claims priority, application United Kingdom, Jun. 15, 1974, 26615/74
Int. Cl.[2] B60T *15/06*
U.S. Cl. 137—627.5 5 Claims

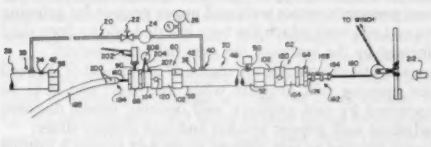


1. A power control valve assembly for a vehicle braking system comprising a housing provided with first, second and third ports for connection respectively to a vehicle brake, a reservoir, and a fluid pressure source, a normally closed inlet valve controlling communication between said first and third ports, said inlet valve comprising an axially moveable inlet valve element and a relatively fixed inlet valve seat disposed between said first and third ports and being normally in engagement with each other so that communication between said ports is normally closed, a normally open exhaust valve controlling communication between said first and second ports, said exhaust valve comprising an axially moveable exhaust valve element and an axially moveable exhaust valve seat disposed between said first and second ports and being normally spaced apart from each other so that said first and second ports are normally in open communication with each other, said inlet valve being axially spaced from said exhaust valve, a passage extending axially between said inlet valve seat and a chamber which is at all times in open communication with said first port to provide fluid communication between said inlet valve seat and said chamber, an axially moveable control rod extending through said passage with clearance thoughout its length which permits fluid flow through said passage past said rod to said chamber, said rod having an axially extending end part of substantially uniform cross sectional area throughout its length and located in said passage adjacent said inlet valve for operating on said inlet valve element to control its position relative to said inlet valve seat, the other end of said control rod engaging with said exhaust valve, and an axially moveable valve actuating member acting on said exhaust valve and arranged to close said exhaust valve element against said exhaust valve seat and then to move said control rod until the end part thereof disengages said inlet valve element from said inlet valve seat, that part of said rod adjacent said end part being of reduced cross sectional area relative to said end part, the cross sectional area of said end part being of a size relative to said passage that during initial unseating of said inlet valve element said end part exerts a substantially constant throttling effect on flow through said passage.

4,090,534
LIVE GAS MAIN INSERTIONS

Luther W. Martin, 1221 Julie Dr., Champaign, Ill. 61820, and Richard L. Smith, Box 682, St. Joseph, Ill. 61873

Filed Mar. 1, 1976, Ser. No. 662,948
Int. Cl.[2] F16K *3/00;* F16L *55/18*
U.S. Cl. 138—97 8 Claims



1. A fitting for insertion of an elongated member longitudinally into an end of a live section of gas main, said fitting comprising a housing providing a passageway opening extending axially therethrough and providing an exterior opening and an interior opening, means for coaxially mounting said housing on said main end with said interior opening in sealing engagement and in coaxial registry with said main end, in which the improvement comprises means on said housing providing a channel extending generally transaxially of said fitting between said exterior opening and said interior opening, and first and second closure members slidably received in said channel and adjustably movable toward one another to decrease the size of said passageway opening and away from one another to increase the size of said passageway opening, said first and second closure members each including a gate member and a resilient gasket member adjacent said gate member, said gate members on said first and second closure members being axially offset from one another, said gate members cooperatively closing with said gasket members therebetween, said gate members and gasket members cooperatively defining an aper-

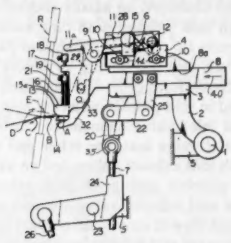
ture having a cross section substantially equal to the cross section of the elongated member, said elongated member being insertable into said passageway and said closure members being movable toward one another sealingly to close said passageway about said elongated member.

4,090,535

APPARATUS FOR FORMING TUCKED-IN TYPE SELVAGES ON A SHUTTLELESS WEAVING LOOM

Toyo Nakanishi, 2-19, Motomachi 1-chome, Katsuyama-shi, Fukui-ken, Japan

Continuation of Ser. No. 604,033, Aug. 12, 1975, abandoned. This application Oct. 18, 1976, Ser. No. 733,117
Claims priority, application Japan, Aug. 21, 1974, 49-95086
Int. Cl.[2] D03D *47/48*
U.S. Cl. 139—434 **13 Claims**



1. Apparatus for forming tucked-in type selvages on a shuttleless weaving loom comprising:

a gripper bracket pivoted at the loom framework at a position in front of a reed of the loom;

means responsive to a control mechanism for swinging said gripper bracket about its pivot;

a gripper slider movably mounted upon said gripper bracket in an arrangement slideable in the warp direction in a reciprocal manner;

means for reciprocating said gripper slider;

an upper gripper formed on the rear end of said gripper slider;

a movably mounted lower gripper disposed adjacent to the rear end of said gripper slider and spring loader into resilient pressure contact with said upper gripper for gripping an end of a weft which has been inserted into an open shed formed by the warps of the material being woven;

means positioned outside the region of movement of the reed for opening said grippers when said weft end is to be captured by said grippers, said opening means disposed adjacent said gripper bracket and said gripper slider;

a cutter pivoted at said gripper slider and having a cutting blade located adjacent to said grippers; and

means positioned outside of the region of movement of the reed for operating said cutter for cutting of said weft end, said means for operating said cutter disposed for movement with said gripper bracket and gripper slider.

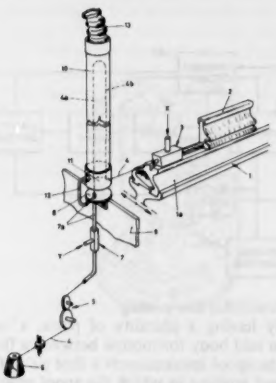
4,090,536

WEAVING LOOM COMPRISING A PNEUMATICALLY OPERATED STORAGE DEVICE

Hubert Peter Van Mullekom, Deurne, Netherlands, assignor to Ruti-Te Strake B.V., Deurne, Netherlands

Filed Jan. 10, 1977, Ser. No. 758,006
Claims priority, application Netherlands, Jan. 20, 1976, 7600569
Int. Cl.[2] D03D *47/34*
U.S. Cl. 139—452 **3 Claims**

1. A loom comprising a continuously operable weft yarn supply mechanism and an intermittently operable weft inserting mechanism, wherein the improvement comprises a tubular storage device having a substantially constant shape in cross-section from one end to the other and storing weft yarn between said mechanisms, the stored yarn being in the shape of a loop having substantially parallel legs, the storage device being in a substantially upright position and having a common entrance and exit at its lower end, said loop opening downwardly toward said lower storage device end, a suction nozzle connected to the upper end of the storage device, and a blowing nozzle adjacent said lower storage device end to propel weft yarn upwardly in a floating condition into the storage device, the suction nozzle helping to keep the weft yarn in such floating condition and sucking fluff away from the lower end of the storage device and discharging it.

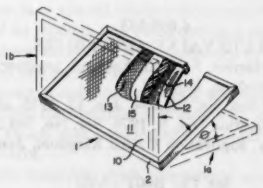


4,090,537

UNITARY, COMPOSITE, MULTI-LAYER WORK AREA

Clifford J. Bollman, 2000 E. Columbia Way, Vancouver, Wash. 98661

Filed Feb. 16, 1977, Ser. No. 769,109
Int. Cl.[2] B21F *27/00*
U.S. Cl. 140—92.1 **17 Claims**



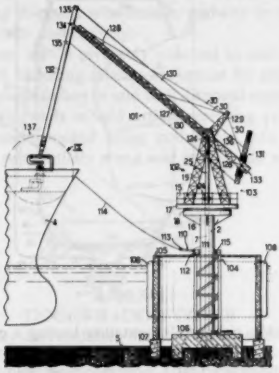
1. A unitary, composite, multi-layer structure for supporting work pieces of differing sizes, shapes, and weights, and any auxiliary equipment required, said work piece support comprising rigid inner permeable core means which acts as a spacer means, and provides substantial rigidity and increases the overall impact-resistant nature of said structure, and outer protective covering layers for encapsulating the inner structural components of said structure, said outer protective covering layers including a plurality of expandable openings which are capable of engaging fastening means of varying sizes which pass therethrough for interlockingly supporting a plurality of work pieces thereon without damaging the structural integrity of said outer layers, the respective outer layers and core means being uniformly joined together one to the other substantially along the entirety of their respective adjacent surfaces to form a laminate-like structure capable of permitting a plurality of fastening means to penetrate said structure for interlocking engagement therewith.

4,090,538

SYSTEM FOR LOADING AND UNLOADING AT SEA A TRANSPORTATION SHIP CONVEYING INCOHERENT PRODUCTS

Michel Kotcharian, Paris, France, assignor to Technigaz, Paris, France

Filed Jun. 26, 1975, Ser. No. 590,679
Claims priority, application France, Jun. 28, 1974, 74 22767; Oct. 11, 1974, 74 34323; Mar. 14, 1975, 75 08062
Int. Cl.[2] B65B *3/04;* F16L *39/04*
U.S. Cl. 141—100 14 Claims



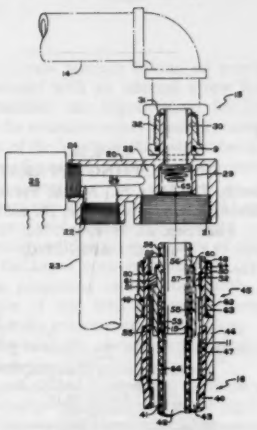
1. A system for loading and/or unloading at seas a ship conveying incoherent products such as in particular fluids and/or powdery solid material, said system comprising a ship mooring column of substantially ring shaped configuration, embedded into the bottom of the sea, an arrangement for transferring said incoherent products comprising a loading and unloading tower supported by the bottom of the sea having an emerged portion and a movable loading arm mounted on said emerged portion, said mooring column surrounding and encompassing said tower in spaced relationship, at least one duct means provided on said loading arm and comprised of two coaxial pipes for the simultaneous flow of fluids flowing in selected directions, an elongated beam framework supporting a first portion of said duct means on its length, said framework being articulated at an intermediate point thereof on the top of said tower of said arrangement, a second portion of said duct means being pivotally connected to said first portion at one end of said beam framework, a balancing counterweight pivotally connected to the other end of said beam framework, two stays connecting said counterweight to said second portion, said two stays being disposed in parallel relationship with said beam framework and equally spaced apart therefrom so as to form a kind of parallel motion with said counterweight and a part of said second portion, respective separate parallel tube extensions for both said coaxial pipes provided at a free end of said second portion, said respective separate substantially parallel tube extensions having flanges at their ends, a piping system on board said ship, said flanges serving for connecting said duct means to said piping system, separable centering means provided between said loading arm and said piping system, said centering means comprising a cooperating pivot and complementary shaped recess selectively provided at the end of said second portion and on said piping system; said piping system comprising: a first pair of pipes at the upper portion thereof, the respective ends of which are in horizontal alignment, two pipe sections forming each one a leg bent at right angles and rigidly braced so as to form a cross-piece, respective rotary joints at two opposite ends of said cross-piece joining said respective ends of said first pair of pipes to said ends of said cross-piece, a second pair of pipes having substantially parallel flanged free end portions corresponding to said tube extensions of said second portion of said duct means and cooperating therewith for connecting said loading arm to said piping system whereas the other ends of said second pair of pipes are in horizontal alignment and hinged through respective rotary joints hingedly connecting said other ends of said second pair of pipes respectively to the other two opposite ends of said cross-piece, said first and second pairs of pipes forming with said two pipe sections an assembly mechanically equivalent to a universal joint coupling, and wherein each pipe of said second pair of pipes comprises an adjustable action valve inserted in series therein for adjustably controlling the flow rate of incoherent product flowing in said pipes.

4,090,539

ANTI-POLLUTION SERVICE STATION ASSEMBLY

Carroll Peter Krupp, Akron, Ohio, assignor to The B. F. Goodrich Company, Akron, OhioIO

Filed Nov. 10, 1976, Ser. No. 740,563
Int. Cl.[2] B65B *57/14;* F16L *39/04*
U.S. Cl. 141—198 12 Claims



1. A fuel hose assembly having a pair of concentric fluid passages therein for conveying a volatile liquid in one direction to a receptacle and returning vapors of said volatile liquid from said receptacle; said hose assembly having a flexible inner hose defining an inner one of said fluid passages; a flexible outer hose having an inside diameter greater than the outside diameter of said inner hose defining an outer one of said fluid passages between said concentric hoses; an outer tubular fitting having end portions, said outer tubular fitting having one end portion secured to said outer hose; said outer tubular fitting having said other end portion with a smaller outside diameter than the outside diameter of said one end portion to provide a shoulder therebetween; the inner peripheral surface of the other end portion of said outer tubular fitting having a pair of spaced circumferentially extending grooves; a spider mounted within said outer tubular fitting between said spaced grooves; snap rings within said grooves to retain said spider in position on said outer tubular fitting to prevent axial movement but permit rotary movement of said spider thereon; said spider having an inner peripheral surface whose diameter is less than the inner diameter of said outer tubular fitting; an inner tubular fitting having a stepped outer configuration defining a large end portion, a small end portion, and an intermediate portion; said intermediate portion of said inner tubular fitting frictionally engaged by said inner peripheral surface of said spider; the juncture of said intermediate portion with said large end portion of said inner tubular fitting defining a shoulder that abuttingly engages said spider; the outer periphery of said small end portion of said inner tubular fitting having a groove; a snap ring located in said last mentioned groove securing said inner tubular fitting to said spider in axially aligned position; said

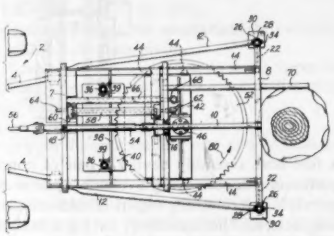
large end portion of said inner tubular fitting secured to said inner hose; said small end portion of said inner tubular fitting having a pair of spaced grooves adjacent to the end thereof, o-rings mounted in said last mentioned spaced grooves; a rotary coupling member having its inner surface frictionally engaged by said other end portion of said outer tubular fitting; said rotary coupling member abuttingly engaged by said shoulder between said one end portion and said other end portion of said outer tubular fitting; said coupling member having an outer one end portion with a plurality of flat surfaces to facilitate the turning of said coupling; and said other end portion of said outer tubular fitting having a groove adjacent the end thereof, a snap ring mounted in said last mentioned groove of said other end portion of said outer tubular fitting to retain said rotary coupling member thereon; and said coupling member having an outer other threaded end portion for connection to a fuel dispensing coupling.

4,090,540

TREE CUTTING APPARATUS

Dale A. Smith, 724 Main St., Mount Vernon, Ill. 62864, and Cyril Barton, R.R. 1, Waltonville, Ill. 62894

Filed Sep. 22, 1976, Ser. No. 725,455
Int. Cl.[2] A01G *23/08*
U.S. Cl. 144—34 R **6 Claims**



1. Tree cutting apparatus comprising:

a rigid frame having means at one end thereof for attachment to a powered vehicle;

a trackway extending longitudinally of said frame;

a carrier movable along said trackway and having a circular saw journalled thereon for rotation in a plane below said frame and trackway whereby said saw is movable to project its periphery beyond the other end of said frame;

at least three vertically adjustable ground-engaging supports on said frame adjacent the ends thereof enabling said frame to be positioned stably on the ground to tilt at a selected angle extending downwardly toward said other end whereby said trackway directs said saw to engage a tree at ground level and sever said tree along an inclined cut below ground level, said vertically adjustable supports including separately adjustable supports including separately adjustable legs on opposite sides of said frame at said other end, said legs being spaced apart a distance greater than the diameter of said saw;

means for rotating said saw concurrently with its movement along said trackway; and

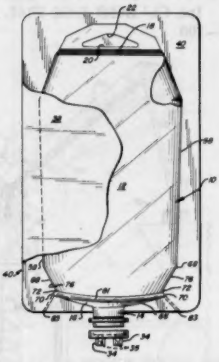
means for advancing said carrier and saw along said trackway toward said other end of said frame to project said saw between said supports and past said other end of said frame.

4,090,541

FLEXIBLE COLLAPSIBLE CONTAINER

Frank Cammarata, III, Palatine; Joe A. Miller, Lake Zurich, and Philip G. Ralston, Jr., Woodstock, all of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Nov. 23, 1976, Ser. No. 744,230
Int. Cl.[2] B65D *1/02*
U.S. Cl. 150—.5 **7 Claims**



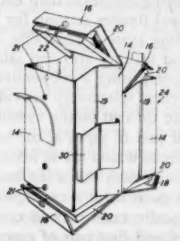
1. A flexible, collapsible container having a generally rigid and oval neck and shoulder portion, connected to flexible walls of essentially 0.01 to 0.03 inch thickness, and defining relatively thinned lines of folding weakness in said container to facilitate flat collapse, the thickness of said lines of folding weakness being less than said surrounding walls, the cross-sections of said lines of folding weakness defining arcs, the circumferential length of the outer surface of each of said arcs being from 40 to 60 percent greater than the direct width of said lines of folding weakness, said lines of folding weakness being positioned about essentially all edges of said shoulder portion, the thinnest wall within said lines of folding weakness being from 40 to 70 percent of the thickness of the container wall adjacent said lines of folding weakness, in which the wall thickness at the ends of said oval shoulder, positioned transversely to the long axis of said oval shoulder is thinner than the edges of said oval shoulder positioned longitudinally of said long axis, whereby said container is collapsible under a negative pressure differential of 20 inches of water, to allow reduction of the internal volume of said container by at least 95 percent.

4,090,542

FOLDABLE TOTE BAG

Walter L. Hacker, Jr., 2221 Patty La., Green Bay, Wis. 54304

Filed Sep. 8, 1976, Ser. No. 721,401
Int. Cl.[2] A45C *7/00*
U.S. Cl. 150—1.7 **5 Claims**



1. A tote bag foldable from an article-receiving position to a collapsed position comprising:

a receptacle having four longitudinal walls and having first and second open ends;

first and second covers hingeably attached to opposite ends of one of said walls, said first and second ends being closable by said first and second covers, respectively;

fastening means attached to the wall disposed opposite to said one of said walls and fastened to said first and second covers, respectively, for fastening said first and second covers to said wall disposed opposite to said one wall, and wherein the walls joining said one of said walls are foldable along longitudinal axes, respectively, each of said axes being disposed substantially midway on each of the joining walls, respectively;

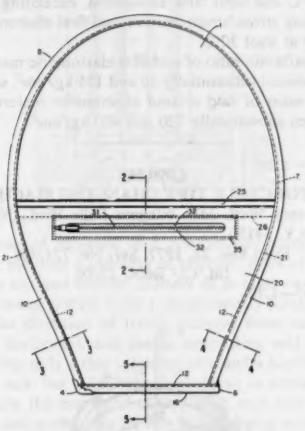
reinforcement means pivotably attached to said one of said walls, and including attachment means for attaching said reinforcement means to said wall disposed opposite to said one of said walls in said article-receiving position, said reinforcement means being collapsible into a position disposed substantially along said one of said walls.

4,090,543

TENNIS RACKET COVER

Norman M. Chyten, Needham, Mass., assignor to Almont Manufacturing Co., Inc., Boston, Mass.

Filed Feb. 14, 1977, Ser. No. 768,035
Int. Cl.² A63B *49/18*
U.S. Cl. 150—52 G **4 Claims**



1. A tennis racket cover comprising a pair of facing front and rear sheets sized and shaped to cover the opposite faces of a tennis racket,

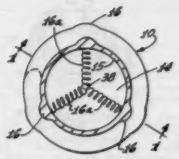
means including a first zipper securing together the peripheries of said sheets along a major portion of their length from one point to a second point with the space between the points providing an opening for a tennis racket handle, said zipper adapted to be unzipped to open said cover along a length of said major portion from said one point for insertion and removal of a tennis racket, a third sheet facing and coextensive with the half of said second sheet adjacent said points said third sheet having a periphery secured to said second sheet including a transverse edge extending across the second sheet substantially at its center, said second and third sheets forming a thin pocket, an elongated slot in said third sheet providing an opening for said pocket, and second zipper means secured in said.

4,090,544

ALL METAL SELF-LOCKING SCREW FASTENER

Mansour A. H. Bagheri, Downey, and Donald W. Stillman, Playa del Rey, both of Calif., assignors to Long-Lok Fasteners Corporation, Cincinnati, Ohio

Division of Ser. No. 288,742, Sep. 13, 1972, Pat. No. 3,843,984, which is a continuation-in-part of Ser. No. 8,454, Feb. 4, 1970, abandoned. This application Jun. 24, 1974, Ser. No. 482,470
Int. Cl.² F16B *39/284*
U.S. Cl. 151—14 R **14 Claims**



1. In a metallic screw fastener having an external screw thread for engagement with an internal screw thread of a complementary member, the improvement for self-locking cooperation with the complementary member, comprising:

at least a portion of the length of the fastener being of generally tubular configuration with a circumferential wall of uniform inside diameter;

at least a portion of said external screw thread being formed on the exterior of said circumferential wall;

said circumferential wall having a plurality of circumferentially spaced thickened portions with each of the thickened portions projecting radially outwardly from the exterior surface of said wall to form a corresponding plurality of radially outward extending lobes;

each of said lobes having a circumferential extent which is substantially less than 180°;

said external screw thread conforming with the cross sectional configuration of said lobes with the pitch diameter of the external screw thread being locally increased by the lobes;

said wall having an inner circumferential surface which is smooth and is generally concentric to the longitudinal axis of the fastener;

said circumferential wall having a uniform radial dimension as measured from its inside diameter to the major diameter of said external screw thread except at the regions of the lobes, and

said wall being sufficiently thin to permit resilient deformation of the wall at the regions of said lobes when the lobes are engaged for interference fit with an internal screw thread of a complementary member with the smooth inner circumferential surface of the wall providing a reduction in the stress concentration within the wall during its resilient deformation.

4,090,545

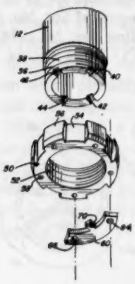
NUT LOCKING MEANS

Arthur J. Ritter, Jr., Metamora, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 16, 1977, Ser. No. 778,202
Int. Cl.² F16B *39/04*
U.S. Cl. 151—28 **9 Claims**

1. A locking arrangement for securing a nut in position on the end of a shaft, said nut being threaded onto the end portion of said shaft, said shaft having a plurality of circumferentially equally spaced apart slots cut radially inward from the outer surface of said shaft, a plurality of equally spaced apart apertures symmetrically arranged in the axially facing end of said nut, a single key having a pair of apertures spaced apart a distance equal to the spacing between two spaced apart apertures in said nut, a tang projecting radially inward from said

key, the centerline of said tang being offset from the centerline of said key, whereby by trial and error the apertures in the key are aligned with successive pairs of apertures in said nut until the tang aligns with and seats in one of said slots in said shaft,



and means for securing said key to said nut with said tang in one of said slots said means permitting said key to be inverted to provide twice as many possible aligning positions of said tang with said slots.

4,090,546

PUNCTURE-SEALING PNEUMATIC TIRE AND A METHOD OF PRODUCING THE TIRE

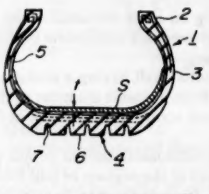
Toshio Honda, Akigawa; Shoji Tanaka, Higashi-Yamato; Koichi Iwami, Kunitachi; Yukio Fukuura, Kodaira; Itsuo Tanuma, Tokorozawa; Yoshikatsu Suzuki, Higashi-Murayama, and Hiromi Akiyoshi, Kodaira, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Dec. 21, 1976, Ser. No. 753,167

Claims priority, application Japan, Dec. 29, 1975, 50-157734

Int. Cl.² B60C *21/08*

U.S. Cl. 152—347 **11 Claims**



9. A method of producing a puncture-sealing pneumatic tire, which comprises diluting a viscous rubber composition consisting mainly of

(A) 100 parts by weight of a mixture of 5–35 parts by weight of at least one non-polar rubber selected from the group consisting of ethylene-propylene copolymer elastomer, ethylene-propylene-diene terpolymer elastomer, polyisobutylene elastomer and isobutylene-isoprene copolymer elastomer, and 95–65 parts by weight of polybutene, and

(B) 5–35 parts by weight of white carbon, with a volatile solvent selected from the group consisting of aromatic hydrocarbons, aliaphatic hydrocarbons, halogenated hydrocarbons, ketones, linear or cyclic ethers and gasoline and of a quantity sufficient to make the concentration of the rubber composition consisting of the non-polar rubber, polybutene and white carbon in the resulting liquid rubber composition 0.1 to 55% by weight,

said viscous rubber composition having a viscosity of 1.6×10^4–2.0×10^6 poises at room temperature and under a shear rate of 100 sec^{-1}; coating the resulting liquid rubber composition on the inner peripheral surface of a vulcanized tire; and volatilizing the solvent to form a puncture-sealing layer composed of the viscous rubber composition on the inner peripheral surface of the tire.

4,090,547

PNEUMATIC TIRE FOR VEHICLES

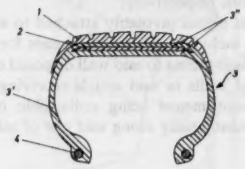
Oskar Schmidt, Kittsee, Austria, assignor to Lim-Holding S.A., Luxembourg, Luxembourg

Continuation of Ser. No. 569,159, Apr. 18, 1975, abandoned.

This application Feb. 23, 1977, Ser. No. 771,311

Int. Cl.² B60C *9/12*

U.S. Cl. 152—354 R **9 Claims**



8. A pneumatic vehicular tire comprising:

a toroidal body of a first elastomeric material with sidewalls integrally interconnected by a sole;

a substantially cylindrically curved belt of a second elastomeric material extending along the periphery of said body outwardly of said sole; and

a tread of a third elastomeric material carried on said sole, said belt lying between said sole and said tread;

said second elastomeric material having a stress/strain ratio, at 20° C and with 50% elongation, exceeding the corresponding stress/strain ratio of said first elastomeric material by at least 30%;

said stress/strain ratio of said first elastomeric material ranging between substantially 30 and 135 kg/cm^2, said stress/strain ratio of said second elastomeric material ranging between substantially 120 and 400 kg/cm^2.

4,090,548

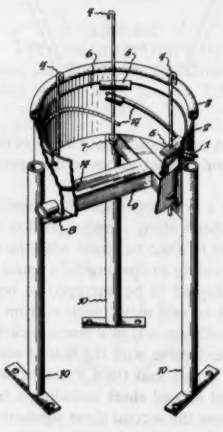
MOTORCYCLE TIRE CHANGING MACHINE

William Henry Wolf, 3436 Niagara Falls Blvd., North Tonawanda, N.Y. 14150

Filed Feb. 22, 1977, Ser. No. 771,028

Int. Cl.² B60C *25/06*

U.S. Cl. 157—1.17 **4 Claims**



1. A tire changing machine, comprising:

a lower support having a base, a tire support fixed to said

base, said tire support being a hollow cylinder, an inner cylinder rotatably supported within said tire support and having a plurality of downwardly inclined cam slots, bearing members secured to said base and said tire support both above and below said cam slots, hook members slidable vertically in said bearing members and fixed to brackets slidable in said cam slots, and means to rotate said inner cylinder relative to said outer cylinder; and

an upper tire support having a ring member adapted to be engaged by said hook members;

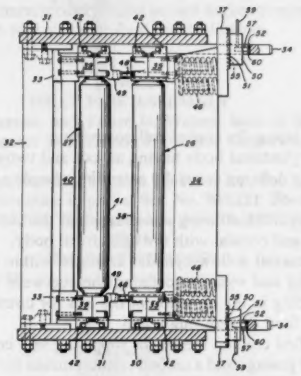
whereby a tire may be held between said upper and lower tire supports by movement of said brackets in said cam slots to cause downward movement of said hook members and engaged upper tire support.

4,090,549

METHOD AND MECHANISM FOR DETERMINING FORCES ON A SOLIDIFYING CASTING

Kenneth D. Ives, Plum Borough, and Ronald S. Vranka, Monroeville Borough, both of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

Filed Jul. 12, 1974, Ser. No. 488,117
Int. Cl.² B22D *11/16*
U.S. Cl. 164—4 **11 Claims**



1. In a curved roll-rack of a continuous-casting machine, which rack includes a plurality of opposed pairs of idler rolls arranged in top and bottom clusters of at least two rolls per cluster, between which rolls a continuously-formed casting travels as its direction of travel changes from substantially vertical to horizontal, and means supporting said rolls, said casting having only a thin solidified skin and a liquid core as it enters said rack, but solidifying throughout its cross section at a plane below the entry end of said rack, said rolls confining the casting and preventing its skin from bulging as long as the core remains liquid, the combination therewith of mechanism for locating said plane and locating improperly positioned rolls in said rack, said mechanism comprising holders which serve as keys for holding said clusters in said supporting means, and load cells mounted on the respective holders of a plurality of the roll-pairs along the length of said rack for indicating the compressive force exerted by each of said roll pairs on the casting.

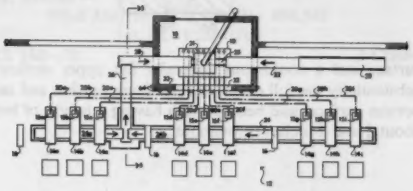
7. In a continuous-casting operation in which a casting emerges from the bottom of a mold and travels between a plurality of opposed pairs of rolls, said casting having only a thin solidified skin and a liquid core as it leaves the mold, but solidifying throughout its cross section at a plane spaced below the mold, said rolls confining said casting and preventing its skin from bulging as long as the core remains liquid, the combination therewith of a method of locating said plane, said method comprising measuring the compressive loads at a plurality of the roll-pairs, and comparing the measurements at the different pairs to determine the pair beyond which there is no further upward trend in the load.

4,090,550

LEAD ACID BATTERY GRID CASTING SYSTEM INSTALLATION AND TECHNIQUE

Bela Szakacs, 2215 Widgon Ct., Winston-Salem, N.C. 27106, and Frank Scrattish, 1082 Edgewood Dr., Winston-Salem, N.C. 27103

Filed Feb. 22, 1977, Ser. No. 770,600
Int. Cl.² B22D *31/00, 25/04, 35/00, 47/00*
U.S. Cl. 164—70 **10 Claims**



1. An installation for the casting of battery grids:

(a) a plurality of casting machines positioned in a first plant area having a first atmosphere therein;

(b) a melting furnace positioned in a second plant area having a second atmosphere therearound, said second plant area substantially isolated from said first plant area by a wall means, said furnace being positioned on a level above the intake of said casting machines;

(c) a feed line means connecting said furnace with said casting machines and extending through an opening in said wall;

(d) whereby the atmosphere of said first area is kept substantially separate from and substantially unaffected by the operation of said furnace.

9. Process for preparing lead for and casting battery grids comprising the steps of:

(a) delivering raw lead to a melt furnace which is separate from and isolated from a casting area;

(b) heating the raw lead in said furnace without agitation to a temperature above the melting point but below the casting temperature;

(c) delivering the resulting molten lead by a gravity feed from the furnace into at least one heated feed line;

(d) heating said molten lead in said feed line during transportation therethrough to the casting temperature in the range of 850°–1000° F. while feeding to at least one casting machine; and

(e) casting said molten lead into battery grids.

4,090,551

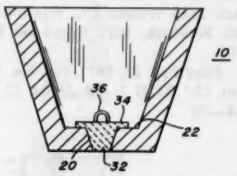
MOLD PROTECTION DEVICE FOR THE BOTTOM OF INGOT MOLDS

Douglas C. Lee, Pittsburgh; Leonard P. Ziemkiewicz; Victor P. Ardito, both of Lower Burrell, and Alex J. Greco, New Kensington, all of Pa., assignors to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 666,551, Mar. 15, 1976, abandoned. This application Jan. 17, 1977, Ser. No. 760,203
Int. Cl.² B22D *7/06, 41/10*
U.S. Cl. 164—137 **10 Claims**

1. The combination of an ingot mold having a bottom with a generally vertical opening therein and a substantially flat top surface surrounding said opening, sidewalls extending upwardly from said flat top surface free of projecting corners and an opening at the top of said sidewalls through which molten metal is poured into said mold; and a ceramic refractory mold protection device comprising a shank portion having a contour adapted to be received within said vertical opening, and a head

portion integrally connected to said shank portion, said head portion having a substantially flat bottom surface extending outwardly from said shank portion a distance of between about 1 and 3 inches and adapted to contact only a portion of said top



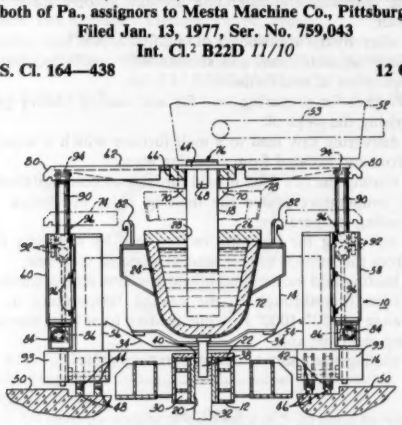
surface and a continuous generally flat upper surface over substantially the full extent of said shank portion and said flat bottom surface, said head portion having a height of between about ¾ and 2 inches throughout.

4,090,552

SHROUD LIFTING EQUIPMENT

Richard J. Laird, Trafford, and Patrick V. Verrone, Pittsburgh, both of Pa., assignors to Mesta Machine Co., Pittsburgh, Pa.

Filed Jan. 13, 1977, Ser. No. 759,043
Int. Cl.[2] B22D *11/10*
U.S. Cl. 164—438 **12 Claims**



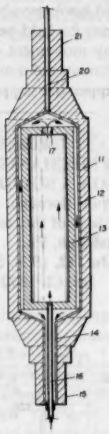
1. In a continuous casting machine, the combination comprising a mould structure, a tundish car, a tundish, means for mounting the tundish on said tundish car, a shroud for molten metal, means for mounting said shroud adjacent said casting machine portion, said mounting means including an elevating arrangement for raising said shroud into sealing engagement with a ladle when supported generally above said mould structure and for lowering said shroud to afford sufficient clearance for removal of said ladle, said shroud being mounted on an elongated supporting bracket spanning said mould structure, said elevating arrangement including a pair of elevating mechanisms engaging the end portions respectively of said bracket, a peripheral supporting flange mounted on said shroud adjacent an upper end thereof, a supporting framework mounted on said bracket adjacent a midpoint thereof and shaped complementarily with external surfaces of said shroud.

4,090,553

INTERNALLY COOLED ROLL

Marcel Beghin, Lille, France, assignor to Fives-Cail Babcock, Paris, France

Filed Feb. 19, 1977, Ser. No. 767,247
Claims priority, application France, Feb. 18, 1976, 76 04400
Int. Cl.[2] B22D *11/12, 11/124;* B21B *27/06;* F28F *5/02*
U.S. Cl. 164—448 **9 Claims**



1. An internally cooled roll comprising
(a) a cylindrical body having an axis and two trunnions, the body defining an axially extending chamber in the interior thereof,
(b) a cylindrical lining countersunk in the chamber by casting and coaxial with the cylindrical body,
(c) a coaxial hollow cylinder arranged within the lining, the lining and cylinder defining therebetween a passage extending in the direction of the axis for circulating a cooling fluid therethrough, and
(d) a first conduit means for supplying said cooling fluid to said passage and a second conduit means for removing the fluid therefrom, at least one of the conduit means being connected with the cylindrical lining.

4,090,554

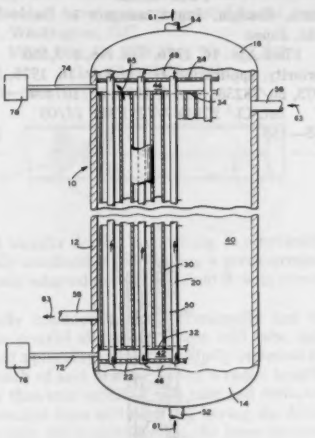
HEAT EXCHANGER

Robert Dickinson, Lynchburg, Va., assignor to The Babcock & Wilcox Company, New York, N.Y.

Filed Nov. 17, 1976, Ser. No. 742,723
Int. Cl.[2] F28F *11/00*
U.S. Cl. 165—1 **3 Claims**

1. A method of indirectly transferring heat in a shell and tube heat exchanger between shellside and tubeside fluids which are reactive in combination with each other and of detecting mixing of said fluids which comprises introducing the shellside fluid into a limited volume interposed between the main body of said shellside fluid from a higher pressure tubeside fluid, whereby heat is transferred between said main body of shellside fluid and the tubeside fluid is through said shellside fluid

within said limited volume, and measuring a predetermined characteristic of the reaction occurring within said limited



volume that characterizes mixing of said higher pressure tube-side fluid with said shellside fluid due to leakage.

4,090,555

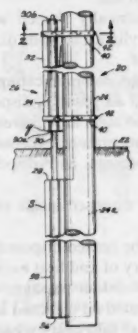
HEAT PIPE ASSEMBLY

John H. Anderson, and Elmer D. Waters, both of Richland, Wash., assignors to McDonnell Douglas Corporation, Long Beach, Calif.

Division of Ser. No. 462,916, Apr. 22, 1974, Pat. No. 4,036,286, which is a continuation-in-part of Ser. No. 303,221, Nov. 2, 1972, Pat. No. 3,823,769. This application Apr. 15, 1977, Ser. No. 787,914

Int. Cl.[2] F28D *15/00*

U.S. Cl. 165—76 **5 Claims**



1. A heat pipe assembly for installation in a permafrost or similar environment comprising:

a heat pipe element including a tubular container having a charge of working fluid therein, said container comprising a normally lower portion of a first predetermined wall thickness, and a normally upper portion of a second predetermined wall thickness which is at least approximately equal to said first wall thickness, said lower container portion wall being sufficiently thin to be effective in transmitting heat, and said upper container portion wall being sufficiently strong and thick to allow safe processing work thereon; and

a heat exchanger including a radiator comprising a tubular body, and heat transferring fins affixed thereto, said upper container portion of said second wall thickness having threads provided on a predetermined part thereof, and said tubular radiator body having threads complementary to said container threads provided thereon, said radiator being attached to said predetermined part of said upper container portion by engaging said radiator threads with said container threads.

4,090,556

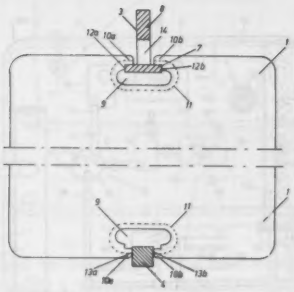
MEANS FOR LOCATING PLATE ELEMENTS IN A DEVICE, SUCH AS A HEAT EXCHANGER, FILTER, OR THE LIKE

Christer Anders Hjalmar Almqvist, Faltspatsvagen 4, S-18340 Taby, Sweden

Filed May 10, 1976, Ser. No. 684,542

Int. Cl.[2] F28F *3/08*

U.S. Cl. 165—78 **2 Claims**



1. In a structure supporting an assembly of plate elements, such as heat exchange plates and the like, in which the tops of the plates are suspended from an inverted T-shaped top bar having a vertical web portion (**8**) and transverse flanges (**7**) for slidably engaging oppositely directed tongues (**10a, 10b**) of a profiled cut-out in the plates to suspend the latter on the top bar, the bottoms of the plates being provided with cut-outs engaging a bottom guide bar (**4**) to hold the suspended plates in position to permit the bottoms thereof to be swung laterally into an inclined, disengaged position; the improvement providing for easy and rapid assembly and removal of the plates comprising:

(a) a plurality of spaced gaps (**14**) in said web portion (**8**) located above said flanges (**7**) which extend continuously along the web portion;

(b) said gaps and said cut-outs (**9**) being profiled so as to allow the plate elements to be twisted about their plane to disengage said tongues (**10a, 10b**) from said flanges (**7**) when the top of the plate elements has been slid into a position facing the gaps and to be withdrawn from the top bar when the bottom of the plate elements has been disengaged from the bottom guidebar.

4,090,557

STEAM HEATING SYSTEM AND CONDENSER THEREFOR

Edward Thomas Currier, 20363 Lorain Rd., Apartment A-1, Fairview Park, Ohio 44126

Filed Jun. 23, 1976, Ser. No. 698,954

Int. Cl.[2] F28B *9/08, 5/00, 1/02;* **F28F** *9/22*

U.S. Cl. 165—110 **4 Claims**

1. In a steam condenser of the type for use in a steam heating system including:

a. an airtight housing having top, bottom, side and end walls defining a condensing chamber;

b. first and second partition means mounted within and extending between the side walls of the condensing cham-

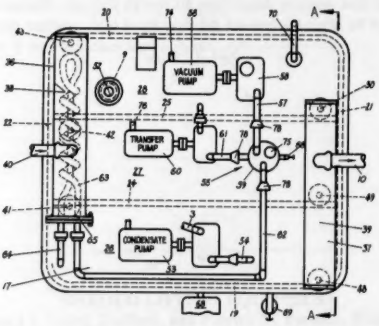
ber, dividing said chamber into first, second and third extending compartments;

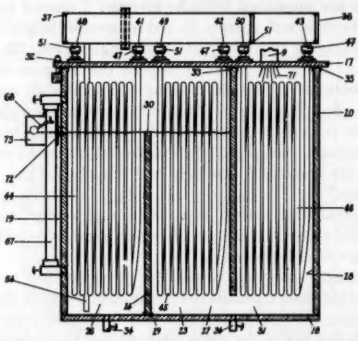
c. opening means formed adjacent the top of the first partition means providing a passage between the first and second compartments;

d. opening means formed adjacent the bottom of the second partition means providing a passage between the second and third compartments;

e. individual coil tube means extending into each of the compartments for condensing steam into condensate in said compartments;

f. steam line means communicating with the third compartment for supplying steam to said compartment for condensing therein, with said steam and condensate being adapted to flow into the second and first compartment through the opening means; and





g. pump means communicating with the first compartment for maintaining the condenser under a vacuum and for removing condensate from within the first compartment of the condenser, said pump means including a vacuum pump having a vapor delivery pipe communicating with the top portion of the first compartment for removing vapor therefrom; in which the vapor delivery pipe has outlets communicating with the third compartment and with the atmosphere; in which cooling means condenses the vapor within the delivery pipe into water and air; and in which vapor trap means communicates with the vapor delivery pipe and separates the air and water contained therein, with the air being discharged into the atmosphere and the water being discharged into the third compartment through their respective delivery pipe outlets, and in which said vacuum pump forms a vacuum within the condensing chamber during the removal of the vapor therefrom.

4,090,558

HEAT EXCHANGING APPARATUS FOR INDUSTRIAL FURNACES

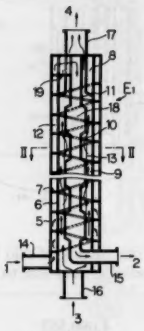
Kazuo Akama, Kasugai, Japan, assignor to Daido Steel Co., Ltd., Aichi, Japan

Filed Apr. 16, 1976, Ser. No. 677,650

Claims priority, application Japan, Apr. 16, 1975, 50/46048; Jun. 24, 1975, 50/78238; Sep. 4, 1975, 50/107404

Int. Cl.[2] F28D *7/12;* **F28F** *13/00*

U.S. Cl. 165—155 **11 Claims**



1. A heat exchanger, for use in an industrial furnace, which utilizes the heat of combustion in a radiant tube of the furnace for preheating the combustion air for the furnace and which includes therein at least one silencing means for diminishing the combustion noise from the radiant tube, said heat exchanger, which is substantially a cylindrical body composed of multiple cylinders, comprises:

a fairly narrow cylindrically shaped upward air passage defined by double cylindrical walls disposed at the outermost portion thereof;

a downward air passage, communicating with said cylindrically shaped upward air passage, disposed concentrically therewith and on the inner side thereof;

a passage for high temperature exhaust gas formed inside said upward air passage and disposed concentrically therewith;

at least one resonator disposed inside said upward air passage;

an inlet for the air to be heated disposed at a lower portion of the outer periphery of said heat exchanger in communication with said upward air passage;

an outlet for the preheated air disposed at a lower portion of the outer periphery of said heat exchanger in communication with the lower end of said downward air passage;

an inlet for the high temperature exhaust gas disposed at the bottom of said heat exchanger in communication with the lower end of said high temperature exhaust gas passage;

an outlet for the exhaust gas disposed at the top of said heat exchanger in communication with the upper end of said high temperature gas passage;

whereby the

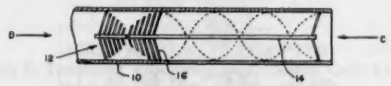
upward stream of the high temperature exhaust gas is able to impart simultaneously the heat thereof to both the upward and downward stream of air, and the

dispositon of the air passage at the outermost side and of the exhaust gas in the central portion increases the efficiency in both the heat exchanging and noise preventing.

4,090,559
HEAT TRANSFER DEVICE

Ferdi E. Megerlin, Grosswallstadt, Germany, assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 14, 1974, Ser. No. 497,549
Int. Cl.[2] F28F *1/40*
U.S. Cl. 165—179 4 Claims

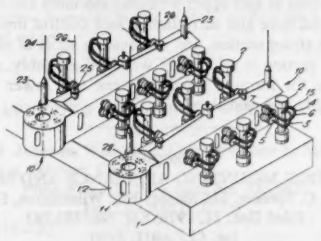


1. A heat transfer device, comprising, in combination:
a thermally conductive tube having a predetermined inside radius and adapted to receive a fluid flow in one direction; and
a thermally conductive brush frictionally and thermally fixed in coaxial alignment within said tube including a stem and a plurality of bristles radially mounted about said stem, each of said bristles having a radial length slightly greater than said radius of said tube and deflected in said one direction from said stem and having the distal ends of said bristles frictionally embed the inner surface of said tube;
whereby the frictional force fixing said brush within said tube is equal and opposite to the total force of the fluid against said brush.

4,090,560
JUNCTION HOUSING FOR USE IN UNDERSEA OIL WELLS

Eivin Hoel, Oslo, and Svein Mathiassen, Kongsberg, both of Norway, assignors to A/S Akers Mek. Verksted, Oslo, Norway

Filed Aug. 20, 1976, Ser. No. 716,233
Claims priority, application Norway, Aug. 27, 1975, 752946
Int. Cl.[2] E21B *41/00*
U.S. Cl. 166—.6 15 Claims

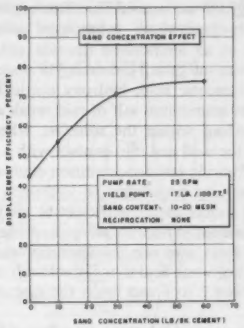


1. A junction housing for pipes and cables which function to connect a plurality of Christmas trees on subsea hydrocarbon wells to the coupling part of a riser, said junction housing including:
side support means;
a plurality of coupling halves mounted on at least one of said side support means for connection to complementary coupling halves on respective Christmas trees;
pipes and cables connected at one end to each of said plurality of coupling halves and extending within said housing away from said coupling halves;
a plurality of coupling elements positioned in association with said junction housing, each of said plurality of coupling elements being connectable to complementary coupling elements in the coupling part of a riser, said pipes and cables being connected to at their other end to said coupling elements; and
each of the pipes and cables from each one of said coupling halves being connected to a single one of said coupling elements.

4,090,561
METHOD FOR CEMENTING WELL PIPE

Jerome L. Powell, Katy, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Continuation-in-part of Ser. No. 679,278, Apr. 22, 1976, abandoned. This application Mar. 24, 1977, Ser. No. 780,747
Int. Cl.[2] E21B *21/00, 33/14*
U.S. Cl. 166—292 7 Claims



1. A method for displacing drilling mud from the annular space surrounding a well pipe arranged in a well bore more efficiently when cementing the well pipe in the well bore comprising the steps of:
displacing said drilling mud from said annular space with a cement slurry containing large particles in the range of about 8 – 40 mesh of particulate material in the amount of at least about 20 pounds per sack of cement.

4,090,562
METHOD AND SOLVENT COMPOSITION FOR STIMULATING THE PRODUCTION OF OIL FROM A PRODUCING WELL

George P. Maly, Newport Beach; John A. Landess, Costa Mesa, and Thomas Foral, Brea, all of Calif., assignors to Union Oil Company of California, Brea, Calif.

Division of Ser. No. 422,657, Dec. 7, 1973, Pat. No. 3,998,743. This application Jul. 29, 1976, Ser. No. 709,624
Int. Cl.[2] E21B *43/25, 43/12*
U.S. Cl. 166—304 4 Claims

1. The method for removing viscous crude oil, waxes, asphaltenes and resin precipitates of petroleum origin from pore spaces of oil-bearing formations, wells and flow lines comprising contacting said waxes, asphaltenes and resin precipitates of petroleum origin with a solvent composition consisting essentially of between about 45 to 85 volume percent of a normally liquid aliphatic hydrocarbon boiling in the range of about 120° to about 550° F. selected from the group consisting of kerosene and aviation turbine fuels; about 5 to 45 volume percent of a normally liquid aromatic hydrocarbon having a boiling point above about 175° F. selected from the group consisting of benzene, toluene, ethylbenzene, cumene, mesitylene and propylbenzene; about 0.5 to 6 volume percent of an aliphatic ether of an aliphatic polyhydric alcohol containing at least one free hydroxyl group, having a boiling point above 212° F. and containing less than about 20 carbon atoms selected from the group consisting of ethylene glycol monobutyl ether and monomethyl ether diethylene glycol; and about 1 to 15 volume percent of a lower alkyl monohydric alcohol selected from the group consisting of methanol, ethanol, propanol, isopropanol and butanol.

4,090,563

INCREASING THE CLAY DISSOLVING CAPABILITY OF A BUFFER-REGULATED MUD ACID

James H. Lybarger; Edwin A. Richardson; Ronald F. Scheuerman, and Charles C. Templeton, all of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Dec. 27, 1976, Ser. No. 754,143
Int. Cl.[2] E21B *43/27*
U.S. Cl. 166—307 7 Claims

1. In a well treating process which comprises:

flowing fluid into a well to contact a siliceous material to be acidized in or around the bore hole of the well; the steps comprising

compounding, for use as said fluid flowing into the well, a substantially pure water solution of solutes consisting essentially of an ammonium fluoride salt, a weak acid selected from the group consisting of water soluble fatty acids, chloroacetic acid, hydroxy acetic acid and citric acid and an ammonium salt of said weak acid in proportions providing within the solution, when the solution flows into the well and into contact with a siliceous material, (a) a fluoride salt concentration equivalent to at least a clay-dissolving proportion of hydrogen fluoride, (b) a weak acid concentration sufficient to convert at least an effective amount of fluoride salt to hydrogen fluoride, and (c) a total weak acid salt concentration sufficient to provide a ratio of weak acid to weak acid salt that yields a pH of from about 3 to 6 and limits the rate of the acidizing reaction;

also, dissolving in said solution an amount of from about 0.05 to 0.3 moles per liter of an ammonium salt of ethylene diaminetetraacetic acid that is effective for increasing the amount of clay dissolved by the solution; and

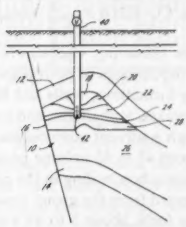
flowing the compounded fluid into the well.

4,090,564

METHOD FOR INCREASING THE RECOVERY OF OIL AND GAS FROM A WATER INVADED GEO-PRESSURED WATER DRIVE OIL RESERVOIR

Harold L. Cook, Jr., and Ernest C. Geer, both of Houston, Tex., assignors to Transco Energy Company, Houston, Tex.

Continuation-in-part of Ser. No. 689,622, May 24, 1976, Pat. No. 4,042,034, which is a continuation-in-part of Ser. No. 589,300, Jun. 23, 1975, abandoned. This application Jun. 14, 1977, Ser. No. 806,414
Int. Cl.[2] E21B *43/00*
U.S. Cl. 166—314 12 Claims



1. A method of increasing the recovery of oil and gas from a water-invaded geo-pressured water drive oil reservoir which has ceased producing oil by conventional production methods comprising,

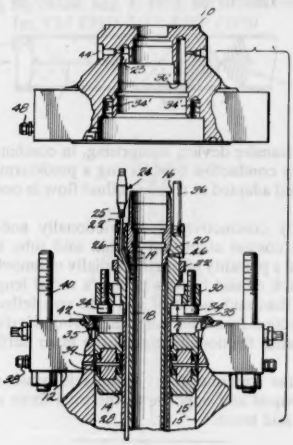
producing fluids including water, gas and oil from a well completed in the oil reservoir, by geo-pressure water drive, at a high enough rate of flow to reduce the bottom hole pressure of the well sufficiently to release gas from the oil and water whereby the gas will expand upon a lowered pressure and the water will recede from the well allowing an increased production of oil and gas.

4,090,565

CONTROL LINE TUBING HANGER

John K. McGee, Houston, Tex., assignor to Gray Tool Company, Houston, Tex.

Filed Sep. 13, 1976, Ser. No. 722,753
Int. Cl.[2] E21B *23/00*
U.S. Cl. 166—315 18 Claims



1. A wellhead assembly comprising

a. an upper wellhead assembly including a tubing string section, a control line of significantly smaller diameter than said tubing string section, and means for mounting said tubing string section and for mounting said control line exterior of said tubing string section,

b. a lower wellhead assembly including means defining a bore therethrough, through which said tubing string section and said control line pass,

c. a sleeve substantially concentric with said tubing string section and ecentric with said control line operatively connected to said upper wellhead assembly and extending into said bore and surrounding said control line and said tubing string section, and terminating short of said tubing string section in said lower wellhead assembly, and

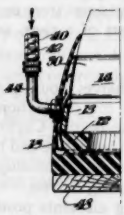
d. means for forming a seal between said lower wellhead assembly and said sleeve.

4,090,566

HORSESHOE MOUNTING APPLIANCE AND METHOD

Dudley W. C. Spencer, 619 Shipley Rd., Wilmington, Del. 19809

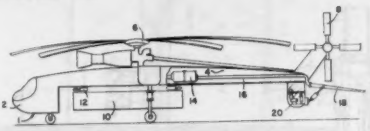
Filed Dec. 21, 1976, Ser. No. 752,742
Int. Cl.[2] A01L *3/00*
U.S. Cl. 168—17 21 Claims



13. A method of mounting a horseshoe to the hoof of a horse comprising applying adhesive material between the horseshoe and the hoof, pressing the horseshoe against the hoof to tempo-

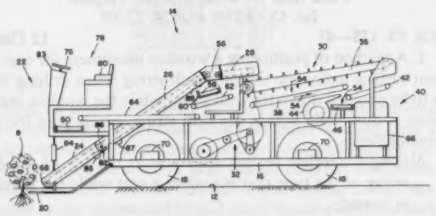
rarily mount the horseshoe thereon, spreading open a boot, fitting the spread-open boot over the horseshoe and hoof, permitting the boot to return toward its non-spread-open condition, attaching the boot to the horseshoe and hoof, inflating an inflatible tube in the boot until the tube presses against the horseshoe to force the horseshoe against the hoof while the adhesive material is curing, and removing the boot after the adhesive material has cured.

4,090,567
FIRE FIGHTING HELICOPTER
Francis E. Tomlinson, 4701 White Oak, Encino, Calif. 91316
Filed Oct. 26, 1976, Ser. No. 735,736
Int. Cl.[2] A62C *27/30*
U.S. Cl. 169—53 **4 Claims**



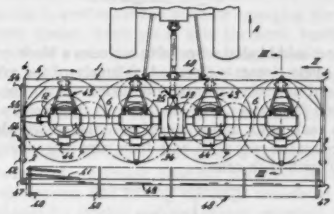
1. Fire fighting helicopter apparatus comprising a helicopter, tank attachment means connected to the helicopter for rapidly attaching and detaching external tanks, an external fire fighting fluid tank connected to the tank attaching means, a high pressure pump mounted amidship, pump driving means mounted on the helicopter and connected to the pump for driving the pump, suction means connected to the pump and to the tank for drawing fluid from the tank into the high pressure pump, a discharge line connected to the pump and extending through the helicopter, a nozzle boom connected to the discharge line and extending from the helicopter for directing fluid from the pump to a fire, swivel means mounted rearwardly on the helicopter and connected between the discharge line and the nozzle boom whereby the snorkel is movable horizontally and vertically to varied positions by the swivel means for discharging fluid in varied directions from the helicopter a control module mounted aft on the helicopter adjacent the swivel means, said tank being positioned sufficiently forward in the helicopter to counterbalance the control module, and means operable in the control module for controlling said swivel means.

4,090,568
VINE HARVESTER FOR USE ON WET AND SLOPING GROUND
Howard B. Johnson, Woodland, Calif., assignor to Martha Willis Button, Winters, Calif.
Filed Aug. 11, 1976, Ser. No. 713,561
Int. Cl.[2] A01D *27/00*
U.S. Cl. 171—27 **16 Claims**



1. Apparatus for harvesting fruit growing on vines planted in parallel rows on seed beds separated by depressed furrows comprising a frame, means mounted on the frame for collecting the fruit, and at least three wheels mounted on the frame for supporting the apparatus during movements thereof along the vine rows, at least, two of the wheels being weight-carrying wheels positioned on and connected to the frame, so that they trail each other in substantial alignment for supporting a major portion of the weight of the apparatus on the seed bed during harvesting operations, and at least one other wheel being a stabilizing wheel positioned on and connected to the frame so that it is disposed in a furrow during harvesting operations, the other wheel carrying a minor portion of the weight of the apparatus.

4,090,569
SOIL CULTIVATING IMPLEMENTS
Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland
Filed Jun. 2, 1976, Ser. No. 691,987
Claims priority, application Netherlands, Jun. 5, 1975, 7506652
Int. Cl.[2] A01B *33/06*
U.S. Cl. 172—59 **7 Claims**

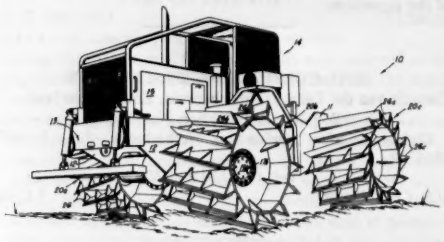


1. A rotary harrow comprising a frame and a plurality of soil working members supported on said frame, said soil working members being rotatable about axes defined by corresponding upwardly extending shafts located in a row that extends transverse to the direction of travel of the harrow, driving means connected to each of said shafts to rotate same and each soil working member consisting of two soil working tools which are located at substantially diametrically opposite sides of the corresponding axis of rotation of that member, each of said tools being freely rotatable about a respective upwardly extending axis responsive to contact of that tool with the ground and each tool having downwardly extending tine means positioned to contact and work the soil during operation, said soil working member being independently movably connected to said frame by corresponding support means and said frame supported above the ground during operation by a rotatable supporting member positioned behind the row of soil working members, with respect to the direction of travel, said rotatable member being connected to the frame with arms.

4,090,570
BLADED WHEEL TRACTOR
William M. Alexander, P.O. Box 128, Fargo, Ga. 31631
Continuation of Ser. No. 590,694, Jun. 26, 1975, abandoned. This application Apr. 4, 1977, Ser. No. 784,277
Int. Cl.[2] A01B *33/00*
U.S. Cl. 172—116 **9 Claims**

8. A bladed wheel tractor comprising:
(a) a tractor having oppositely extending axles;
(b) bladed wheels respectively on said axles; said bladed wheel each including a radially extending web member received for rotation on its associated axle, a polyangular tubular rim and including a series of rim flat plates joined by their edges about the exterior of said rim, said rim being secured to the periphery of said web member intermediate the ends of said rim, said rim being concentric with said axle, the portion of said rim protruding outwardly of said axle, said bladed wheel including blade elements respectively carried by and protruding outwardly of said rim plates; and
(c) means for removably securing said web to said axle; said

tractor having a front protion and a rear portion pivotally connected to each other about a vertical axis, said front portion having a pair of the oppositely extending axles forming front axles, said rear portion having a pair of the oppositely extending axles forming rear axles, and an engine, each of said axles being individually driven by said



engine; said bladed wheel also includes a blade on each of said blade elements disposed obliquely of the axis of said rim and wherein a pair of said bladed wheels are disposed on said front axles, with their rims in transverse alignment with each other and a pair of said bladed wheels are disposed on the rear axles with their rims in transverse alignment with each other.

4,090,571

SOIL CULTIVATING IMPLEMENTS

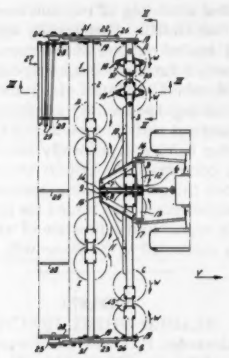
Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Filed Jul. 7, 1976, Ser. No. 703,267

Claims priority, application Netherlands, Jun. 16, 1976, 7508289

Int. Cl.[2] A01B *21/06*

U.S. Cl. 172—169 **6 Claims**



1. A soil cultivating implement comprising a frame having elongated frame beams that extend transverse to the direction of travel and a plurality of tined soil working members supported on said beams, said soil working members being arranged in a number of pairs on each of said beams and the beams being arranged one behind the other, with respect to the direction of travel of the implement, the soil working members of each pair being freely rotatable about corresponding upwardly extending axes and having tines positioned to work adjoining strips of soil, the axes of rotation of the soil working members of said pair converging in an upward direction when viewed from the rear, said soil working members being rotated responsive to contact of their tines with the ground and the soil working members of said pair being normally rotated in relative opposite directions, the pairs of soil working members on the forward beam being positioned to work strips of soil located between other strips of soil worked by the members on a rearward beam, each beam, together with respective pairs of soil working members, being independently turnable about the longitudinal axis of that beam and means fixing said beam in any of a plurality of chosen positions.

4,090,572

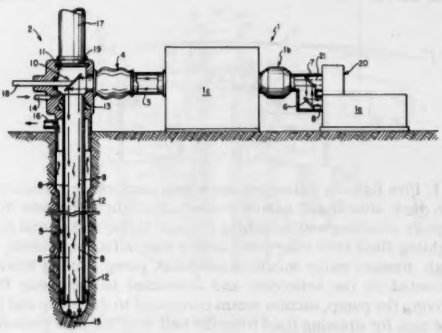
METHOD AND APPARATUS FOR LASER TREATMENT OF GEOLOGICAL FORMATIONS

Albert B. Welch, Dallas, Tex., assignor to Nygaard-Welch-Rushing Partnership, Dallas, Tex.

Filed Sep. 3, 1976, Ser. No. 720,361

Int. Cl.[2] E21B *7/00*

U.S. Cl. 175—16 **38 Claims**



1. A method of drilling through a subterraneous formation by a laser beam of sufficient energy to penetrate through the formation by melting or vaporizing the material in its path comprising:

a. introducing under pressure a gas which is substantially transparent to the laser beam into a bore extending through such formation;

b. directing the beam through the pressurized gas to the surface to be drilled; and

c. guiding and confining the beam passing through the pressurized gas over a substantial portion of the beam path along the bore to overcome effects of beam spreading so that adequate energy density is delivered at said surface to at least melt the material thereat.

4,090,573

WIRELINE SEALING APPARATUS AND METHOD FOR USE WITH A DRILL STRING

E. Edward Rankin, Great Yarmouth, England, assignor to Petro-Data C.A., Dallas, Tex.

Filed Aug. 18, 1976, Ser. No. 715,328

Int. Cl.[2] E21B *47/024, 33/08*

U.S. Cl. 175—45 **12 Claims**

1. A method of positioning a wireline instrument for concurrent surface indication within a drill string when drilling fluid is to be pumped down the drill string while the wireline instrument is downhole within the drill string, comprising the following steps:

placing a wireline sealing apparatus at the top of the drill string of the type that maintains a seal while the wireline is moved;

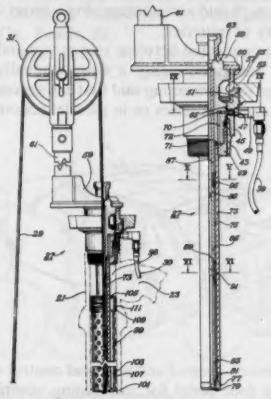
lowering the wireline instrument to the lowest point that it is adapted to reach;

sealing the wireline against pressure within the drill string by means of the wireline sealing apparatus;

pumping drilling fluid down the drill string;

removing slack in the wireline by applying tension to the wireline while the seal is maintained and drilling fluid is

being pumped until the position at which the wireline instrument commences to move is reached; and



maintaining the wireline within the drill string substantially at said position.

4,090,574

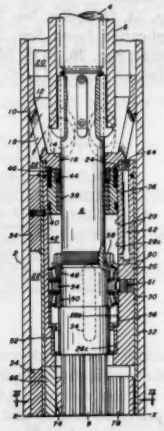
GEAR SYSTEM FOR AN OIL WELL DRIVE

Marion A. Garrison, Denver, Colo., assignor to Empire Oil Tool Company, Denver, Colo.

Division of Ser. No. 568,496, Apr. 16, 1975, abandoned. This application Oct. 7, 1976, Ser. No. 730,399

Int. Cl.[2] E21B *5/00;* **F16H** *1/10, 1/20*

U.S. Cl. 175—106 **2 Claims**



1. In an oil well drive having an outer housing, a fluid driven motor having a shaft coaxial with said outer housing, and a drill bit within said outer housing and driven by said motor; the improvement of a reduction gear system between said motor shaft and said drill bit; said reduction gear system comprising an upper spacer connected to said outer housing adjacent said motor shaft, a lower spacer connected to said outer housing adjacent said drill bit, each of said spacers having an outer cylindrical portion engaging said outer housing, an externally threaded inner ring portion on the end adjacent the other spacer and a portion extending inwardly from said cylindrical portion to said ring portion, said inwardly extending portion having a plurality of holes therethrough, an elongated tube within said outer housing extending between said spacers, said tube having an outside diameter substantially less than the inside diameter of said housing, a plurality of keys fastened to and extending through the wall of said tube and spaced apart longitudinally at a plurality of stations around its periphery, said tube being held in fixed position in said housing by said keys with the tube contacting said housing at one longitudinal line, a passageway for said motor fluid between said tube and housing communicating with said openings in said spacers, a pair of sets of meshing pinions and internal gears having a substantially larger diameter than the pinions, a shaft connecting the internal gear of the first set to the pinion of the second set, a second shaft supporting the pinion of the first set, a third shaft supporting the internal gear of the second set, the axes of said second and third shafts being in alignment and parallel to but spaced from the axis of the first shaft, a plurality of eccentric bushings one for each reduction gear shaft mounted within said tube in abutting end to end relationship, threads on the top eccentric bushing engaging the threads on the top spacer, threads on the lowest eccentric bushing engaging the threads on the lower spacer, keyways in said eccentric bushings for receiving at least some of said keys, bearings in said eccentric bushings for supporting their respective shafts, the top reduction gear shaft being connected to said motor shaft, the lowest reduction gear shaft being connected to said drill bit, a piston surrounding said top shaft and having an opening from its top end to the pressure of said motor fluid, a spring urging said piston downwardly, a grease chamber between the adjacent ends of said spacers and having openings therefrom at each end, and means for closing said last named openings.

4,090,575

WEIGHING APPARATUS OF THE ELECTROMAGNETIC LOAD COMPENSATION TYPE INCLUDING PROTECTIVE SHIELD MEANS

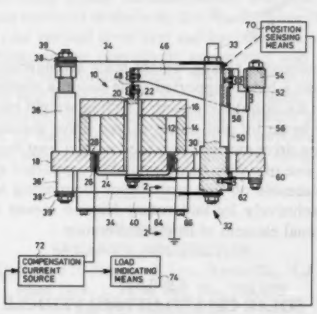
Peter Kunz, Tann-Ruti, and Felix Strobel, Greifensee, both of Switzerland, assignors to Mettler Instrumente AG, Greifensee, Switzerland

Filed Feb. 8, 1977, Ser. No. 766,759

Claims priority, application Switzerland, Apr. 1, 1976, 4056/76

Int. Cl.[2] G01G *3/14, 7/00*

U.S. Cl. 177—210 EM **7 Claims**



1. In a weighing apparatus of the electromagnet load compensation type including stationary pot-type permanent magnet means containing at one end an annular air gap which is open at one end; an annular compensation coil arranged asymmetrically relative to said permanent magnet means concentrically within the open end of said air gap; a movable pan carrier member connected for movement between normal no-load and load positions relative to said magnet means; means connecting said compensation coil with said pan carrier member; and means operable when the pan carrier member is displaced from said no-load position relative to said permanent magnet means for supplying compensation current to said compensation coil to return said pan carrier member to its no-load position;

the improvement which comprises

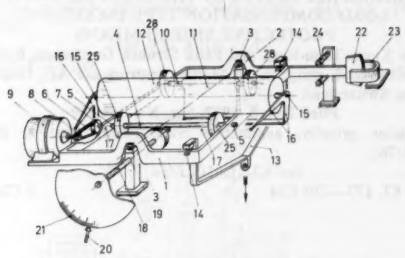
protective shield means connected with said permanent magnet means and extending in spaced relation completely across the open end of said air gap and the compensation coil contained therein for shielding said coil against the effects of stray magnetic flux and particles of impurities, said protective shield means being formed of a ferromagnetic material and being connected in flux transmitting relation with said permanent magnet means; and further wherein the axis of said permanent magnet means is arranged vertically, said permanent magnet means including spaced parallel horizontal upper cover and lower base plates, one of said plates containing said annular air gap; and further wherein said means connecting said compensation coil with said pan carrier member includes a dish-shaped coil carrier member having an annular flange portion which extends within the open end of said air gap and upon which said compensation coil is mounted, said coil carrier member being arranged in protected relation between said protective shield means and said permanent magnet means.

4,090,576

SLIDING-WEIGHT SCALE

Werner Haack, Giacomettistrasse 102, CH-700 Chur, Switzerland

Filed Sep. 29, 1976, Ser. No. 728,419
Claims priority, application Germany, Oct. 1, 1975, 2543719
Int. Cl.[2] G01G *7/00*
U.S. Cl. 177—214 **9 Claims**



1. An automatic sliding-weight scale arrangement employing a frame; a hinge-supported scale beam; a continually motor-driven friction drive means; a sliding weight moved along said scale beam by said motor-driven drive means; wherein: said friction drive means is provided with at least two frictional elements, one of which being rotatably supported and lengthwise displaceable on said scale beam for moving said sliding weight exclusively by said rotary friction means supporting said frictional element at its circumference.

4,090,577

SOLAR CELLED HYBRID VEHICLE

Wallace H. Moore, 283 Argonne Ave., Long Beach, Calif. 90803

Filed Apr. 18, 1977, Ser. No. 788,623
Int. Cl.[2] B60L *11/18, 15/02;* **B60K** *9/00*
U.S. Cl. 180—44 M **5 Claims**

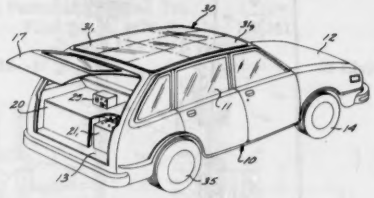
1. In a gas driven automobile including an internal combustion engine having associated therewith gearing and a first differential, said engine gearing and differential being disposed proximate a first axle connected to be driven thereby, said automobile further including a second axle, the improvement comprising:

a second differential connected to said second axle for distributing power thereto, said second differential including an input shaft for receiving power applied thereto and sprocket means mounted on said input shaft;

electric motor means attached to said second axle including chain drive means connected to said sprocket means;

a first and second array of batteries disposed within said automobile each said array comprising a series connection of a plurality of batteries;

control means connected between said arrays and said electric motor means including a first, manually selected, control stage for connecting said first and second arrays to said motor means in series or in parallel according to the



manual selection thereof and a second control stage articulated by a foot pedal for interposing combinations of current limiting resistors between said first stage and said motor means according to the position of said foot pedal; and

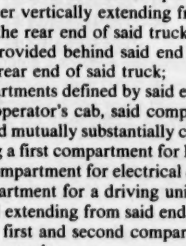
solar panel means disposed on said automobile and connected across said first and second array for recharging said batteries when said first control stage is in said series connecting mode.

4,090,578

BATTERY OPERATED FORK-LIFT TRUCKS

Akibumi Shinoda, Handa, and Masahiko Shimizu, Obu, both of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya, Japan

Filed Sep. 23, 1976, Ser. No. 725,935
Claims priority, application Japan, Sep. 27, 1975, 50/116863; Sep. 23, 1975, 50/130533; Sep. 26, 1975, 50/132594
Int. Cl.[2] B60K *17/30*
U.S. Cl. 180—52 **7 Claims**



1. A battery operated fork-lift truck comprising:

an end frame member vertically extending from a base support adjacent to the rear end of said truck;

an operator's cab provided behind said end frame member and open at said rear end of said truck;

a plurality of compartments defined by said end frame member around said operator's cab, said compartments being of individually and mutually substantially closed construction and including a first compartment for hydraulic apparatus, a second compartment for electrical control devices and a third compartment for a driving unit;

a first partition wall extending from said end frame member and defining said first and second compartments in front of said end frame member;

means defining a separate open space below said first and second compartments; and

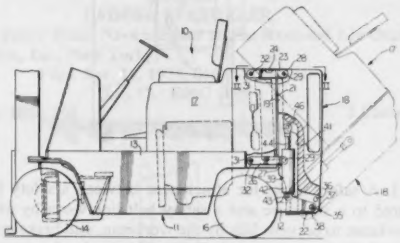
a second partition wall extending from said end frame member along the height of said operator's cab and defining said third compartment adjacent to said operator's cab behind said end frame member.

4,090,579

INDUSTRIAL TRUCK HAVING A PIVOTAL HOOD AND COUNTERWEIGHT ASSEMBLY

Robert N. Stedman, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed May 2, 1977, Ser. No. 793,212
Int. Cl.[2] B62D 25/12
U.S. Cl. 180—69 R 4 Claims



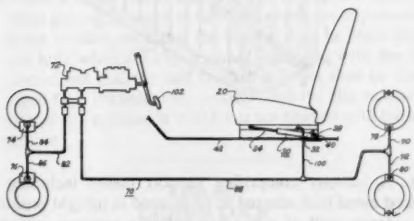
1. An industrial truck comprising:
a frame having an end portion and a mid portion;
a hood having a first portion and being normally seated on the mid portion of the frame;
a counterweight having a first portion positioned adjacent the first portion of the hood and a second portion positioned adjacent the frame end portion, said counterweight being connected to the hood;
means for pivotally connecting the counterweight to the frame end portion for pivotal movement of the counterweight and the hood in unison and relative to the frame between a first position at which the hood is seated on the frame and a second position at which the hood is spaced from the frame; and
a fluid jack having first and second elements movable relative to each other, said first element being pivotally anchored to the frame end portion and said second element being pivotally connected to the counterweight, said fluid jack being of a construction sufficient for pivoting the counterweight and hood between the first and second positions.

4,090,580

VARIABLE LENGTH ANCHORING DEVICE FOR VEHICLE SEATS

Ronald A. McLennan, 520 Maple Row, Elkhart, Ind. 46514

Filed Feb. 25, 1977, Ser. No. 771,885
Int. Cl.[2] B60R 21/10; B60N 1/08
U.S. Cl. 180—103 BF 8 Claims



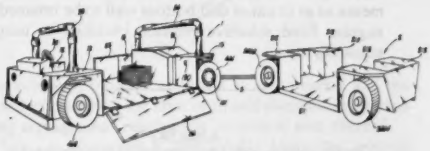
1. A variable length anchoring device for vehicle seats having a forwardly and rearwardly adjustable seat portion: said device comprising a hydraulic cylinder assembly, fixture means for securing one end of said assembly to the forward part of said seat portion, a fixture means for securing the other end to a rigid support below said seat portion, said assembly having a cylinder, hydraulic fluid in said cylinder, a piston in said cylinder, a rod connected to said piston and extending from one end of said cylinder, means connecting the end of said cylinder opposite said rod to one of said fixture means, means connecting the end of said rod opposite said piston to the other of said fixture means, a conduit connecting opposite ends of said cylinder on opposite sides of said piston, valve means for restricting the flow of fluid between the opposite ends of the cylinder, and means responsive to the deceleration of the vehicle for closing said valve means and preventing movement of said piston in said cylinder.

4,090,581

CARRIER VEHICLE STEERING SYSTEM

Earl L. Miner, Long Lane, and Harold G. Jones, Lebanon, both of Mo., assignors to Detroit Tool and Engineering Company, Lebanon, Mo.

Filed Nov. 4, 1976, Ser. No. 738,730
Int. Cl.[2] B62D 5/04
U.S. Cl. 180—140 34 Claims



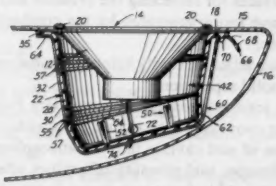
1. A carrier vehicle comprising:
(a) a body including a longitudinal axis, a front end having a pair of transversely disposed vertical swivel axes, and a pair of associated vertical pivot axes each disposed in spaced relation from its said front vertical swivel axes, and a rear end having a pair of transversely disposed vertical swivel axes, and a pair of associated vertical pivot axes, each disposed in spaced relation from its said rear vertical swivel axes,
(b) a pair of front wheel means mounted to the body for rotation about said front vertical swivel axes,
(c) a pair of rear wheel means mounted to the body for rotation about said rear vertical swivel axes, and
(d) steering means including:
(1) actuating means mounted to the body,
(2) swiveling means including front and rear rotating means mounted to the body for rotation about said front and rear vertical pivot axes and having upper and lower portions, means operatively connecting said actuating means to said rotating means lower portions for rotation about said front and rear vertical pivot axes, and means operatively connecting said rotating means upper portions to associated wheel means for swiveling of said wheel means about said front and rear vertical swivel axes.

4,090,582

SPEAKER PROTECTOR

Dennis F. Deschu, 176 Highland Ave., Yardville, N.J. 08620

Filed Nov. 2, 1976, Ser. No. 738,025
Int. Cl.[2] H05K 5/00
U.S. Cl. 181—150 25 Claims



1. A speaker protector to enclose the rear of a speaker

mountd on a panel in a motor vehicle or the like, said speaker protector comprising

A. housing means including

(1) a bottom wall,

(2) a tapered side wall extending upwardly and outwardly from said bottom wall, and

(3) an outwardly extending circumferential rim connected to said side wall, said rim having an upper surface and an inner surface terminating in an outer margin, said side wall defining a cavity adapted to receive therein the rear of the speaker to enclose same,

B. A mounting means operatively associated with said rim for securing said housing means to the panel,

C. adjusting means operatively associated with said side wall for permitting angular selective positionment of said bottom wall relative to said rim so as to facilitate mounting of said housing means in a variety of locations, and

D. locking means operatively associated with said housing means so as to cause said bottom wall to be retained in the angular fixed selective position obtained in using said adjusting means.

4,090,583

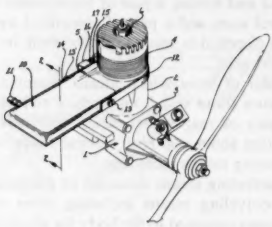
STREAMLINED MONOLITHIC INTERNAL COMBUSTION ENGINE MUFFLER

James L. Leonard, 8631 E. Roanoke, Scottsdale, Ariz. 85257

Filed Feb. 2, 1976, Ser. No. 654,188

Int. Cl.[2] F01N *7/10, 1/08*

U.S. Cl. 181—240 **17 Claims**



1. A monolithic muffler mounted in fluid communication with an exhaust stack of an internal combustion engine for damping the noise generated during combustion within the engine, said muffler comprising in combination:

a. a one piece body having a butt end in engagement with the outlet of the exhaust stack for minimizing reverberation and vibration induced by the exhaust gases expelled from the exhaust stack;

b. a plurality of cavities collectively having a transverse cross-sectional area no greater than the cross-sectional area of the exhaust stack outlet and extending from the butt end into said body for receiving the exhaust gases flowing through the exhaust stack outlet,

c. each cavity of said plurality of cavities having curved surfaces for reflecting the pressure and audible frequency wave forms generated by the combustion within the engine;

d. each adjacent cavity being separated one from another by a solid separation;

e. at least one passageway extending from each said cavity for conveying the exhaust gases within the corresponding one of said cavities into the atmosphere;

f. whereby, said plurality of cavities attenuate the pressure and audible frequency wave forms of the exhaust gases expelled from the engine and said plurality of passageways diffusingly convey the exhaust gases into the atmosphere.

4,090,584

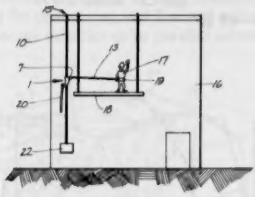
SAFETY BRAKE

Nick J. Wagner, 289 Jupiter Dr., Cincinnati, Ohio 45238

Filed Jun. 17, 1977, Ser. No. 807,346

Int. Cl.[2] B65H *59/16*

U.S. Cl. 182—5 **4 Claims**



1. A safety brake for attachment between a safety line secured to a structure and a safety belt line worn by an aerial workman to prevent falls by the workman, said brake comprising a hollow arcuate axis helical guide member having an inlet and outlet located at opposite ends thereof and adapted to receive the safety line therethrough, connecting means adjacent said inlet for attaching to the safety belt line, and rope engaging means adjacent said inlet and said opposite connecting means for exerting a drag on the safety line, said brake being adapted to be placed at any location on the safety line with said inlet positioned above said outlet and to be moved by the workman therealong, said brake being adapted to pivotally assume a rope engaging position upon a downward force applied to said connecting means along the safety belt line whereby said engaging means may be caused to contact the safety line to exert a drag thereon for preventing downward movement of said brake along the safety line.

4,090,585

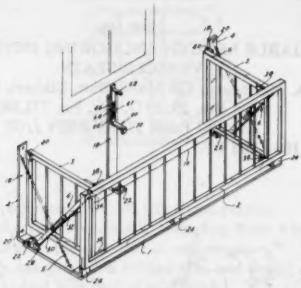
BALCONY FOR USE ON EXTERIOR WALLS OF BUILDINGS BELOW WINDOWS

Charles E. Laub, 32 Prices La., Staten Island, N.Y. 10314

Filed Nov. 9, 1976, Ser. No. 740,184

Int. Cl.[2] E04B *1/346;* **A62B** *5/00, 3/00*

U.S. Cl. 182—47 **12 Claims**



1. A balcony comprising support means including two spaced metal bars adapted to be secured in upright position to an exterior wall of a building below a window, outwardly extending pivot mounting means at the lower ends of said bars, a platform pivotally connected to each of said pivot mounting means for movement to and from horizontal and vertical positions about a pivot axis spaced outwardly from the plane of said support means, said metal bars being about the same height as said platform in upright position with one being adjacent to one end of said platform and the other being adjacent to the other end thereof, means secured at one end to the upper ends of said metal bars and at the other end to said platform remote

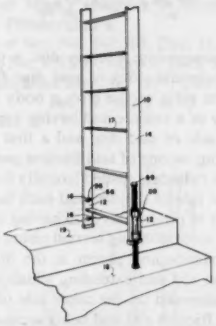
from said pivotal connection to hold said platform in said horizontal position against downward force, foldable guard means pivotally connected to said platform adapted to be folded against the upper surface thereof and to occupy the space between the support means and the platform when the platform is raised to vertical position, and means for removably latching said platform in raised vertical position.

4,090,586

LADDER STABILIZER

Roy A. Pears, Reno, Nev., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Apr. 11, 1977, Ser. No. 786,269
Int. Cl.[2] E06C 7/44
U.S. Cl. 182—204 **2 Claims**



1. A ladder fitted with means to detachably fasten a leg support unit to either lower leg section of the ladder, said leg support unit fitted with means to regulate the distance from the bottom end of the leg support unit to the points of fastening of the unit to the ladder leg, in which

the leg support unit is formed of a housing threaded to a support rod that extends through the lower end of said housing, with the housing fitted with a pair of spaced shaped brackets, each projecting from a common side of the housing, and in which

each lower leg section of the ladder is formed with a pair of spaced through holes, each said hole being of a size to fit about a said bracket, with

each bracket extending from the housing by a length not less than the thickness of a ladder leg in the direction of the axis of a said hole, with a clip member rotatably mounted to the end of each bracket and of a size to extend beyond the profile of the bracket, with

each said hole in a ladder leg section formed with at least one radial groove of a size to freely fit about the clip member of the bracket, such that the bracket may be fitted into a said hole when the clip member is aligned with the said groove, but that the said bracket may not then be disengaged from the ladder leg section when the clip member is rotated to a position in which it is not aligned with the said groove.

4,090,587

LADDER LOCK

Edwin G. Pyle, 9213 Ethel St., Cypress, Calif. 90630

Filed Oct. 18, 1976, Ser. No. 733,328
Int. Cl.[2] E06C 7/48
U.S. Cl. 182—206 **1 Claim**

1. A locking device for use in securing the upper end of a ladder to an object comprising:

a mounting structure adapted for selective engagement to said ladder;

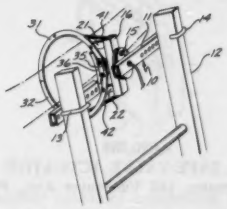
a support fixture secured for rotation to said structure, including means for selective angular attachment thereof relative said structure;

a first and second pivotal mount respectively attached to the ends of said fixture;

a first and second arcuate element respectively secured for substantially coplanar pivotal motion to said first and second pivotal mounts;

a joining bracket pivotally secured at the ends thereof to the proximate ends of said first and second elements;

securing means connected to said bracket for engagement thereof in a predetermined alignment relative said fixture;



an arcuate support pad connected to said bracket and disposed to extend on the interior of said elements in overlapping arrangement relative the proximate ends thereof;

said bracket comprises a substantially triangular segment pivotally joined at two corners thereof to said proximate ends of said first and second elements; and

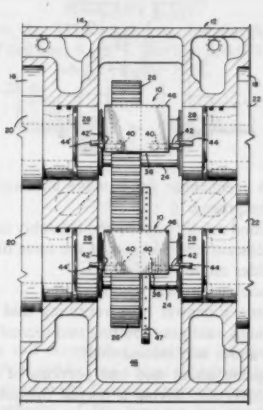
said securing means comprises a flexible cord secured at one end to the third corner of said segment and disposed to selectively secure said segment relative said fixture.

4,090,588

MEANS FOR LUBRICATING MACHINE COMPONENTS

Larry Neil Willover, Painted Post, N.Y., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Sep. 17, 1976, Ser. No. 724,319
Int. Cl.[2] F01M 9/06
U.S. Cl. 184—11 A **12 Claims**



1. Means for lubricating machine components, comprising:

a lubricant reservoir;

said reservoir having an open-top and a lubricant outlet, said outlet opening onto a first plane;

rigid conduit means coupled at one end thereof to said outlet, and opening onto a second plane spaced apart from said first plane; and

lubricant collector means coupled to said top for directing lubricant into said reservoir; wherein

said reservoir has inner walls joined to an inner bottom

surface, in which to confine lubricant, said bottom surface defining a lowermost given level of said reservoir;

said outlet comprises an opening formed in said reservoir, opening inwardly onto one of said walls, and outwardly of said reservoir;

said conduit means is coupled to said opening and has a lubricant discharge means formed in an end thereof opposite said one end;

said discharge means is disposed in a level elevated from said given level; and

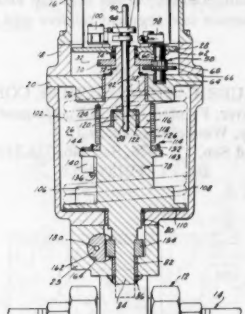
said opening is disposed in a level intermediate said given and elevated levels.

4,090,589

FAIL SAFE VALVE ACTUATOR

John Herman Fitzwater, 160 Vancouver Ave., Warwick, R.I. 02886

Filed Oct. 23, 1975, Ser. No. 625,264
Int. Cl.[2] F16D *13/02*; G05G *17/00*; F03G *1/00*
U.S. Cl. 185—40 R **15 Claims**



1. A clutch mechanism for a valve actuator, said clutch mechanism comprising:

first and second axially aligned and rotatably mounted shafts having adjacent end portions of the same diameter;

a first shoulder on said first shaft;

a second shoulder on said second shaft;

a gear having a central bore receiving said second shaft therethrough, said gear abutting said second shoulder and rotatable about said second shaft;

a torsion spring about said end portions of said first and second shafts and having a normal diameter that is less than the diameter of said end portions of said first and second shafts, said spring having one end bearing against said first shoulder and a second end connected to said gear, said torsion spring operable to tighten upon and couple said shafts for mutual rotation in response to rotation of said first shaft in a first direction; and

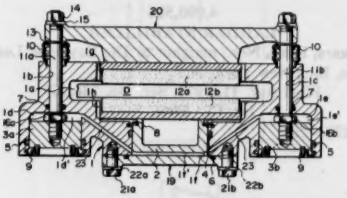
clutch disengagement means including gear engagement means for engaging the teeth of said gear to prevent rotation with said second shaft so that rotation of said second shaft in the opposite direction causes an expansion of the diameter of said spring and disengagement of said shafts.

4,090,590

DISC BRAKE WITH POSITIVELY ACTUATED PADS

Yasuo Karasudani, Yokohama, and Hiromi Yazawa, Nishimine, both of Japan, assignors to Tokico Ltd., Kawasaki, Japan

Filed Oct. 20, 1976, Ser. No. 734,354
Claims priority, application Japan, Oct. 20, 1975, 50-126150
Int. Cl.[2] F16D *55/228*
U.S. Cl. 188—72.5 **1 Claim**



1. A disc brake comprising: a rotary disc; a pair of friction pads disposed on opposite sides of said disc for application against said opposite sides of the disc; a body adapted to be secured to the body of a vehicle and having a center cylinder positioned on one side of said disc and a first piston in said center cylinder acting on one of said friction pads, and further having a pair of side cylinders spaced laterally from said center cylinder on said one side of the disc and each having a second piston therein; a pair of piston rods each having one end adjustably connected to a corresponding second piston for adjustment relative to the corresponding piston in the direction of the length of said piston rod and extending slidably through said body; and a beam disposed on the other side of said disc and acting on the other friction pad and being secured to the other ends of said piston rods, whereby when said brake is actuated, said first piston operates in one direction for applying said one friction pad against said one side of the disc and at the same time, said second pistons operate in the opposite direction for moving said beam toward the other friction pad so as to apply the other friciton pad against the other side of the disc.

4,090,591

BRAKE SHOE FOR DISC BRAKES

Hans Pöllinger, and Franz Prahl, both of Munich, Germany, assignors to Knorr-Bremse GmbH, Munich, Germany

Filed Oct. 22, 1976, Ser. No. 734,766
Claims priority, application Germany, Oct. 23, 1975, 2547529
Int. Cl.[2] F16D *69/04*
U.S. Cl. 188—73.1 **8 Claims**

1. A brake shoe for vehicle disc brakes comprising a brake lining support member having inner and outer surfaces, a lining guide means comprising a groove having a bottom wall and first and second longitudinal side walls in the inner surface of said support member, said first side wall being inclined relative to said bottom wall to form a wedge profile therewith and said second side wall being substantially perpendicular to said bottom wall of said groove, a brake lining having a longitudi-

nal dove-tail guide thereon, said dove-tail guide being received in said groove and having first and second edges, and at least one spring means mounted on said outer surface of said support member and having a first portion thereof extending through an opening in said support member into said groove at said perpendicular side wall of the groove to engage behind one of said edges of the dove-tail guide on the brake lining when the lining is positioned on said lining guide and the other of said edges of the dove-tail guide being engaged with the inclined side wall of the groove such that the dove-tail guide is clamped in said groove between said inclined side wall and the extending portion of said spring means.

4,090,592

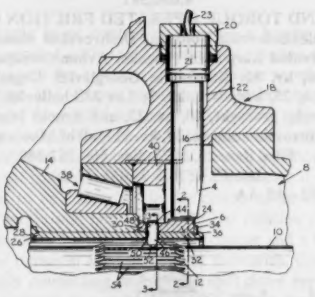
WHEEL SPEED SENSOR FOR DRIVE AXLE

Raymond John Jovick, Troy, and Roger James Malott, Union Lake, both of Mich., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 640,355, Dec. 15, 1975, which is a division of Ser. No. 575,159, May 7, 1975, Pat. No. 3,949,841. This application Mar. 10, 1977, Ser. No. 776,165

Int. Cl.[2] B60T *8/08*

U.S. Cl. 188—181 R **4 Claims**



1. An anti-wheel lock brake control system for controlling the brakes of a pair of wheels mounted on the ends of a drive axle of a vehicle, said drive axle including a housing and a pair of axle shafts and a differential mechanism therein for operationally rotating each said axle shaft which is respectively associated with one of said wheels, said axle shafts being joined to said differential mechanism in a manner which allows movement thereof during said rotating which is transverse with respect to said housing, said system comprising:

a valve capable of delivering operating air pressure to said both brakes;

a computer capable of receiving an input voltage signal for controlling said valve by issuing commands thereto to cause said valve to deliver a proportional amount of said operating air pressure to said both brakes for preventing either of said wheels from locking;

a wheel speed sensor mounted on said drive axle at each side of said differential mechanism inwardly of each said wheel in alignment with its corresponding said axle shaft;

said wheel speed sensor including an electromagnetic sensing device, an excitor rotor and means for maintaining within predetermined limits a predetermined distance therebetween during rotational and transverse movement of said axle shaft;

said excitor rotor being mounted for rotation in response to said rotational movement of its respective said axle shaft without responding to said transverse movement thereof; and

said electromagnetic sensing device being aligned with said excitor rotor for sensing its said rotation and providing said input voltage signal to said computer which is unaffected by said transverse movement of said axle shaft and thus indicative of the speed of its respective said wheel.

4,090,593

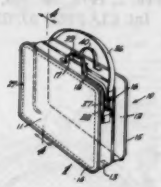
EXPANSIBLE CONTAINER

William Koff, 2100 S. Ocean La., Ft. Lauderdale, Fla. 33316

Filed Aug. 31, 1977, Ser. No. 829,293

Int. Cl.[2] A45C *7/00*

U.S. Cl. 190—44 **14 Claims**



1. An expansible container comprising, in combination, a first compartment having a pair of opposed first side panels and a peripheral interconnecting first gusset, means for opening said first gusset along the top thereof to gain access to the interior of said first compartment, a second compartment normally disposed within said first compartment and having an auxiliary side panel opposed to one of said first compartment side panels and a peripheral second gusset interconnecting said auxiliary side panel and said one of said first compartment side panels, and means for opening said second gusset along the top thereof to gain access to the interior of said second compartment, said first gusset being flexible enough to permit the turning of said first compartment inside out upon the opening of said first gusset opening means, whereby said second compartment will extend outwardly of one side of said first compartment for conversion of the container assembly from unexpanded configuration to expanded configuration.

4,090,594

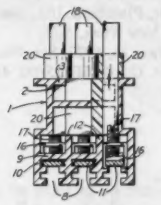
TROLLEY RAIL

Donald R. Ross, Jr., 435 Clokey Ave., Pittsburgh, Pa. 15228

Filed Sep. 6, 1977, Ser. No. 830,672

Int. Cl.[2] B60M *1/34*

U.S. Cl. 191—23 A **8 Claims**



1. A trolley rail comprising a tubular housing formed of insulating material and having a front side provided with parallel laterally spaced walls forming therebetween parallel slots extending lengthwise of the housing for receiving current pick-up members movable lengthwise of the rail, a partition wall extending across the inside of the tubular housing and closing the inner sides of the slots, the opposite side walls of each slot being provided beside said partition wall with a pair of opposed grooves extending lengthwise thereof, electrical conductor bars in said slots with the edges of the bars retained in the pairs of grooves therein, said partition wall and the back side of the housing having pairs of aligned openings therethrough, each pair of openings communicating with a different one of the slots, U-shape metal clips disposed in said partition wall openings and straddling the adjoining conductor bars, the

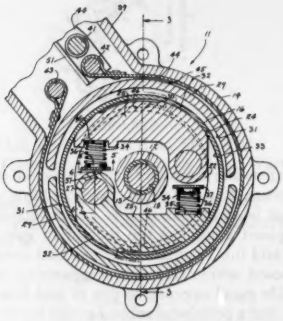
clips having inturned free front edges in front of said bars, and means in the clips pressing conductor bars therein against said inturned edges of the clips.

4,090,595

BRAKE RELEASED CLUTCH MECHANISM

Hugh A. Zindler, Rte. 3, Box 264, Pleasant Valley La., Watertown, Wis. 53094, and Sheldon D. Pollow, W201 N10360 Willow Creek Rd., Colgate, Wis. 53017

Filed Feb. 2, 1976, Ser. No. 654,214
Int. Cl.[2] F16D *67/02*
U.S. Cl. 192—17 R 15 Claims



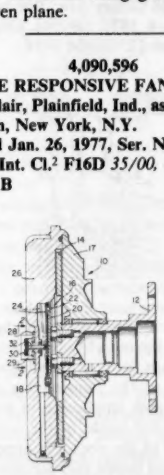
1. In a clutch mechanism for disposition between rotatable drive and driven members, a drum carried on said drive member, clutch shoes pivotally carried on said driven member and being movable relative thereto in a given plane into and out of clutching engagement with the drum, means for effecting movement of said shoes into engagement with the drum to drivingly clutch the drive and driven members together, and a brake band for effecting movement of said shoes out of engagement with the drum and to stop rotation of the driven member without interrupting the rotation of the drive member, said brake band and means for effecting movement of the shoes into engagement with the drum being generally disposed in and acting in said given plane.

4,090,596

TEMPERATURE RESPONSIVE FAN DRIVE COUPLING

Everett George Blair, Plainfield, Ind., assignor to Wallace Murray Corporation, New York, N.Y.

Filed Jan. 26, 1977, Ser. No. 762,713
Int. Cl.[2] F16D *35/00, 43/25*
U.S. Cl. 192—58 B 3 Claims



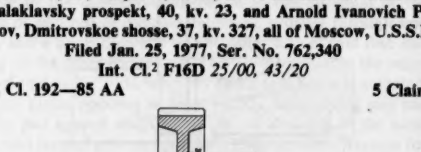
1. A temperature controlled fluid coupling adapted to couple a radiator cooling fan of an internal combustion engine to the engine to thereby rotate the fan, the fluid coupling being of the type including a housing having a drive chamber into which a rotor both extends and is positioned, a shear liquid reservoir chamber in the housing, the reservoir chamber communicating with the drive chamber through a temperature controlled valve, the amount of valve opening determining the degree of rotary coupling between the engine and the fan, the valve in one position establishing maximum rotary coupling, a bi-metal laminate mounted on the housing and actuating the valve, bowing of the bi-metal laminate in one direction due to changes in its ambient temperature causing the valve to open and bowing of the laminate in the opposite manner causing the valve to close, the improvement comprising, means for mounting the bi-metal laminate on the housing in a desired, predetermined orientation relative to the valve, whereby mounting of the bi-metal laminate on the housing is possible only when the bi-metal is oriented with respect to the housing in the predetermined manner.

4,090,597

FLUID AND TORQUE OPERATED FRICTION CLUTCH

Anatoly Alexandrovich Folomin, Dmitrovskoe shosse, 37, kv. 100; Vsevolod Karpovich Fesenko, Avtomotornaya ulitsa, 4, korpus 6, kv. 52; Konstantin Georgievich Evgrafov, ulitsa Usievicha, 25, korpus 1, kv. 8; Lev Mikhailovich Yakovlev, Balaklavsky prospekt, 40, kv. 23, and Arnold Ivanovich Petrov, Dmitrovskoe shosse, 37, kv. 327, all of Moscow, U.S.S.R.

Filed Jan. 25, 1977, Ser. No. 762,340
Int. Cl.[2] F16D *25/00, 43/20*
U.S. Cl. 192—85 AA 5 Claims

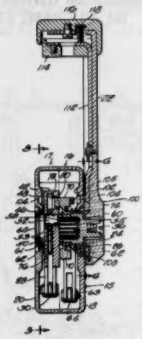


1. A friction clutch for gas-turbine engine transmission gear comprising: a casing; a back plate rigidly connected to said casing; a pressure plate mounted for axial movement in said casing in a spaced apart relationship to said back plate; firction plates mounted in said casing between said pressure plate and back plate; a piston mounted in said casing having one side adjacent to said pressure plate; a variable-volume chamber defined by said casing and piston communicating with a source of fluid under pressure to control the axial movement of said piston for pressing said friction plates when the gas-turbine engine operates in the traction mode; a cam mechanism coupling said piston to the shaft of the gas-turbine engine transmission gear for axial displacement of said piston for pressing said friction plates when the gas-turbine engine operates in the braking mode; a cylinder mounted in said casing; a second piston mounted in said cylinder and rigidly connected to said first piston; and auxiliary variable-volume chamber defined by said cylinder and said second piston, the auxiliary chamber being located opposite to said variable-volume chamber defined by said casing and first piston, and communicating, via a throttle aperture, with a fluid source, whereby additional pressure application to said piston and friction plates resulting from rotation of fluid together with said chamber is eliminated.

4,090,598
SINGLE LEVER REMOTE CONTROL

Anthony P. Prince, Waukegan, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Feb. 10, 1977, Ser. No. 767,556
Int. Cl.[2] B60K *41/02*
U.S. Cl. 192—.096 14 Claims



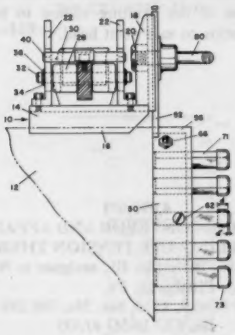
14. A single lever control comprising a housing, a shaft member supported within said housing for rotation relative to said housing and for axial movement relative to said housing between first and second positions, a main control lever adapted to be connected to the throttle of an engine, means connecting said shaft member to said main control lever for common rotation therewith from a neutral ppsition and for common axial movement therewith, a clutch shift drive member adapted to be connected to the clutch of an engine and supported within said housing for coaxial rotation relative to said shaft member between a neutral position and a shift position and for common axial movement therewith, drive means for releasably connecting said clutch shift drive member and said shaft member to provide common rotary movement of said shaft member and said clutch shift drive member when said shaft member is in the first position and to permit relative rotation of said shaft member to said clutch shift drive member, in response to rotational movement of said main control lever, when said shaft member is in the second position.

4,090,599
METHOD AND APPARATUS FOR PERMANENT MARKING OF METAL

Calvin E. Kelly, 3558 Mayer Dr., Murrysville, Pa. 15668, and John F. Lang, 336 W. 11th Ave., Homestead, Pa. 15120

Filed Sep. 22, 1975, Ser. No. 615,594
Int. Cl.[2] B44B *5/00;* B41J *1/28*
U.S. Cl. 400—134 18 Claims

1. An apparatus for marking a metal workpiece, comprising:
a. means for supporting said apparatus in contact with said metal workpiece to be marked, said means comprising:
1. a plate;
2. at least two legs attached to and depending from said plate so that said support will accommodate different size workpieces; and
3. means for securing a stamp holder frame to said plate;
b. a stamp holder frame for receiving a stamp holding means engageable with said means for supporting said apparatus, said frame comprising:
1. a housing;
2. a slide plate engageable by said means for securing said frame to said support plate through a vertical slot in said slide plate, said slide being secured to the outer periphery of said housing so that said housing can be adjusted in a plane parallel to the face of said workpiece to be marked; and
3. means for loosely retaining a flexible stamp holding means in said housing;
c. a flexible stamp holding means, having a groove on at least a portion of the periphery thereof for engagement therein

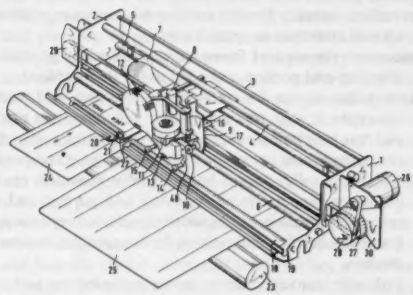


of said means for retaining said stamp holding means in said housing and having holes molded therein of a size to provide a push fit on a stamp means, movably mounted in said stamp holder frame; and
d. stamp means carried by said flexible stamp holding means.

4,090,600
PRINTING DEVICE FORMS COMPENSATION AND RIBBON CONTROL MEANS

Horst H. Biedermann, Augsburg, Germany, assignor to NCR Corporation, Dayton, Ohio

Filed Feb. 28, 1977, Ser. No. 773,105
Claims priority, application Germany, Sep. 22, 1976, 2642540
Int. Cl.[2] B41J *33/58, 3/12*
U.S. Cl. 400—213 6 Claims



1. A printing device for printing on record media, comprising:
a first frame,
printing means including a print head mounted on said first frame and including a second frame, ribbon means including ribbon driving means supported on said second frame means pivotally mounting said second frame and said ribbon means to said printing means, said ribbon means including a printing ribbon positioned in operative relation to the print head and the record media, said printing means and said first frame being capable of relative movement therebetween;
guide means secured to said first frame and having an operating surface which is non-parallel to the path of relative movement between the printing means and said first frame; and
sensing means operatively coupled to said ribbon means and being urged by the force of gravity acting on said ribbon

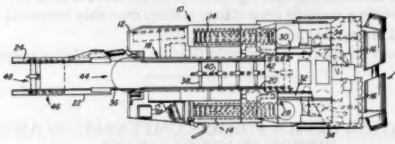
means including said ribbon driving means into engagement with said operating surface of said guide means to cause said ribbon means to shift position with respect to said print head during relative movement between the printing means and the first frame to cause different transverse portions of the printing ribbon to be located in operative relation to said print head.

4,090,601

MINING MACHINE CONVEYOR AND APPARATUS FOR CONTROLLING THE TENSION THEREON

Donald L. Freed, Jr., Belleville, Ill., assignor to National Mine Service Company, Pittsburgh, Pa.

Filed Nov. 9, 1976, Ser. No. 740,199
Int. Cl.[2] B65G *41/00*
U.S. Cl. 198—316 **9 Claims**



1. A mining machine conveyor and apparatus for controlling the tension thereon comprising,

a mining machine body portion mounted on means for propelling said body portion,

a conveyor support frame extending longitudinally on said body portion,

an endless laterally flexible continuous conveyor positioned on said conveyor support frame,

said conveyor support frame having a laterally pivotal discharging end portion and a receiving end portion,

front roller means for rotatably supporting said endless conveyor at said conveyor frame receiving end portion and rear roller means for rotatably supporting said endless conveyor at said conveyor frame discharging end portion, said front roller means being fixedly mounted on said conveyor support frame receiving end portion and said rear roller means being mounted on said conveyor support frame discharging end portion for longitudinal movement thereon,

a hydraulic conveyor drive motor mounted on said conveyor support frame and drivingly connected to said rear roller means for moving portions of said endless conveyor at a preselected speed from said receiving end portion to said discharging end portion,

extensible means supported by said conveyor support frame and connected to said rear roller means for maintaining a preselected tension on said endless conveyor and to remove slack therein,

a hydraulic circuit for transmitting fluid under pressure to said hydraulic conveyor drive motor to actuate said hydraulic conveyor drive motor to move portions of said endless conveyor at a preselected speed from said receiving end portion to said discharging end portion, and

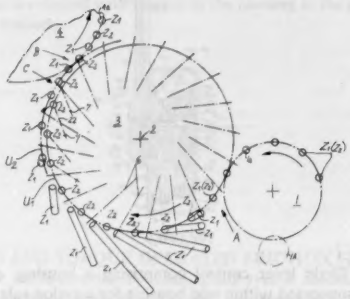
conduit means for connecting said hydraulic circuit to said extensible means to supply fluid under pressure thereto and actuate said extensible means so that the pressure exerted by said extensible means upon said rear roller means is proportional to the operating pressure of said hydraulic conveyor drive motor.

4,090,602

TIP TURNING APPARATUS FOR CIGARETTES OR THE LIKE

Bernhard Schubert, Neu Bornsen, and Dietrich Bardenhagen, Hamburg, both of Germany, assignors to Hauni-Werke Korber & Co. KG, Hamburg, Germany

Filed Jun. 7, 1977, Ser. No. 804,451
Claims priority, application Germany, Jul. 20, 1976, 2632557
Int. Cl.[2] B65G *47/24*
U.S. Cl. 198—377 **10 Claims**



1. Apparatus for inverting successive filter cigarettes or analogous rod-shaped articles in one of two adjacent rows of articles and for shuffling the inverted articles with the articles of the other row, comprising an inverting conveyor rotatable about a first axis; sets of first and second article receiving means, said first receiving means being parallel to said axis; means for articulately connecting said first receiving means to said conveyor, including pivot members having second axes which are parallel to said first axis and about which said first receiving means are movable between first and second arcuate paths respectively nearer to and more distant from said first axis; means for articulately connecting said second receiving means to said conveyor, including fulcra having third axes crossing in space with and located in a plane normal to said first axis, said second receiving means being movable about the respective third axes through 180° between first positions in said first path and second positions in said second path, each of said second receiving means being in end-to-end alignment with a first receiving means in said first path and being parallel with and located behind a first receiving means in said second path; means for moving successive second receiving means from first to second position during a first stage of each revolution of said conveyor; means for moving successive first receiving means from said first into said second path during a later second stage of each revolution; means for supplying pairs of coaxial articles into successive aligned first and second receiving means at a first station at which such receiving means are located during a third stage preceding said first stage of each revolution; and means for accepting articles from alternating first and second receiving means at a second station at which such receiving means are located during a fourth stage following said second stage of each revolution of said conveyor.

4,090,603

COLLECTING ARRANGEMENT

Erland Marklund, Skelleftea, Sweden, assignor to Renholmens Mekaniska Verkstad AB, Byske, Sweden

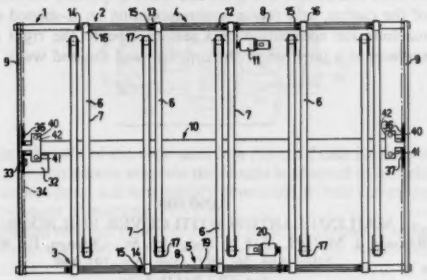
Filed May 12, 1976, Ser. No. 685,511
Claims priority, application Sweden, May 13, 1975, 7505472
Int. Cl.[2] B65G *47/26*
U.S. Cl. 198—460 **7 Claims**

1. A collecting arrangement of the type set forth comprising a support frame having first and second frame sides;

a first conveyor having its one end portion pivotally mounted at said first frame side of said support frame and its other end portion directed toward an opposed second frame side of said support frame;

a second conveyor having its one end portion pivotally mounted at said second frame side and its other end portion directed toward said first side;

said conveyors intersecting at an intersection point; a carrier girder supporting said first and second conveyors between



said first and second frame sides in different planes and enabling transfer of an article from said first conveyor to said second conveyor;

said carrier girder being movable in and against the feed direction of said first and second conveyors to change the intersection point between said first and second conveyors and thus the effective length thereof; and

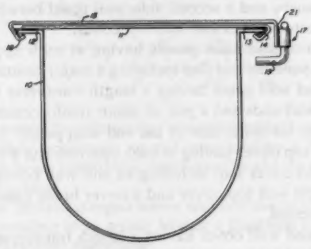
means to move the carrier girder in response to the differences of the supply of the feed conveyor and the demand of the discharge conveyor.

4,090,604

COVER CONSTRUCTION

Charles W. Reifert, Muscatine, Iowa, assignor to Grain Processing Corporation, Muscatine, Iowa

Filed Sep. 13, 1976, Ser. No. 722,539
Int. Cl.² B65G *15/60, 33/00*
U.S. Cl. 198—861 **3 Claims**



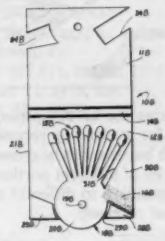
1. A cover for material handling equipment having flange elements thereon, said cover means including a lower cover plate of sufficient size to extend at least to said flange elements and having on one side only downwardly and inwardly projecting means for positioning under a flange element on material handling equipment, an upper cover plate overlapping at least a portion of said lower cover plate in superimposed position and having on one side thereof a downwardly and inwardly projecting means for positioning under a flange element on material handling equipment and on the distal side thereof a downwardly extending flange portion.

4,090,605

SAFETY MATCHBOOK

Wilmer David Walker, Jr., 1316 Sharon St. NW., Atlanta, Ga. 30314

Filed May 28, 1976, Ser. No. 690,953
Int. Cl.² A24F *27/00*
U.S. Cl. 206—110 **3 Claims**



1. A matchbook comprising:

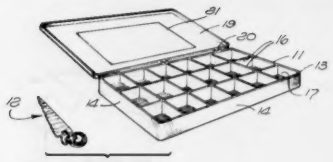
(a) a cover having a first face and a second face, top and bottom surfaces and having a substantially open first side and a substantially open second side, said first face of said cover having a match removal opening extending radially from the mid-portion of said first face toward said first side of said cover and further having a match striking opening substantially adjacent said second side of said cover;

(b) a match carrier including a plurality of matches extending radially in a flat group from said carrier, a match striking surface in a position on said carrier remote from said plurality of matches, and a shield surface adjacent said plurality of matches between said plurality of matches and said match striking surface, said carrier being rotatably mounted in said cover in an arrangement such that said carrier may be rotated into a first position wherein the match most closely positioned in said plurality of matches toward said first side can be rotated into registration with said removal opening and said carrier may be rotated into a second position wherein the match most closely positioned in said plurality of matches toward said first side is substantially remote from said removal opening and from said first side of said cover, said shield surface is positioned between said plurality of matches and said second side, and said striking surface is in registration with said match striking opening;

(c) a first stop means in said cover for preventing the rotation of said match carrier beyond said first position to a position in which the matches positioned inwardly of said match most closely positioned in said plurality of matches toward said first side can be in registration with said match removal opening thereby insuring that only the match most closely positioned toward said first side may be removed; and

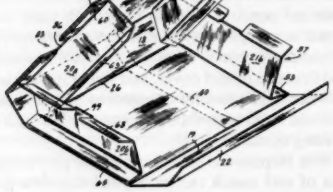
(d) a second stop means in said cover for preventing the rotation of said match carrier past said second position into a position in which said match striking surface is in registration with said match striking opening and said shield surface is not positioned between said plurality of matches and said second side of said cover thereby preventing exposure of said plurality of matches when said match striking surface is in registration with said match striking opening.

4,090,606
WATCH SPRING BAR KIT
Wayne G. Dawson, 757 3rd St., McFarland, Calif. 93250
Filed Jan. 21, 1977, Ser. No. 760,965
Int. Cl.[2] B65D *85/30*
U.S. Cl. 206—223 **14 Claims**



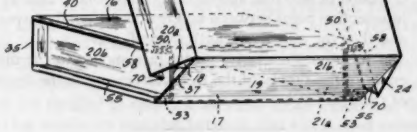
1. A watch spring bar kit comprising:
gauge means for measuring recesses in watch cases into which watch bands are to be connected, said gauge means having a series of different portions with different dimensions corresponding to different standard widths respectively for said recesses;
a container;
a supply of spring bars of different lengths to be connected into watch case recesses of said different standard widths;
different coding markings on said different portions respectively of said gauge means; and
coding markings on said spring bars corresponding to said markings on the gauge means to key the spring bars to the gauge means so that when a particular one of said differently dimensioned portions of the latter matches the recess of a particular watch case, the marking of that portion of the gauge means will indicate that a particular type of spring bar having a corresponding marking will fit the recess.

4,090,607
MAILING CARTON FOR BOOKS
Richard J. McCall, 1515 N. Sedgwick St., Chicago, Ill. 60610
Filed Apr. 14, 1977, Ser. No. 787,484
Int. Cl.[2] B65D *5/36*
U.S. Cl. 206—424 **8 Claims**



1. A mailing carton comprising:
a one-piece blank of paperboard stock having spaced flat sides separated by corrugations to form inside and outside surfaces of the carton,
said blank having a main top wall panel and a main bottom wall panel each having opposite end edges and sides,
a first side wall panel between the top and bottom panels, and a second side wall panel adjacent a side of one of said main top and bottom panels,
each of said main panels having at each of its opposite ends a three-panelled end flap including a major, centrally disposed end wall panel flanked by two minor reinforcement panels extending parallel to the ends of the main panel, one of said minor panels of each end flap adjoining the main panel and another lying opposite said end wall panel therefrom,
each end edge of one of said main panels and each of the minor reinforcement panels adjoining same being notched in register with one another to form a recess and each of the minor reinforcement panels to the end flaps opposite the other of said main panels also being recessed to register with said recess in the assembled carton,
whereby in assembled form there is provided triple thickness corners and double thickness end walls to protect the contents of the carton, said recess accommodating an L-shaped sealer machine for application of a sealing tape to the right angle surfaces at a junction of the top wall and the end walls.

4,090,608
MAILING CARTON WITH COVER FOR BOOKS
Richard J. McCall, 1515 N. Sedgwick St., Chicago, Ill. 60610
Filed Apr. 26, 1977, Ser. No. 791,069
Int. Cl.[2] B65D *5/36*
U.S. Cl. 206—424 **6 Claims**

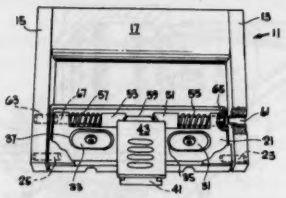


1. A mailing carton with cover comprising:
a one-piece blank of paperboard stock having spaced flat sides separated by corrugations to form inside, outside, and cover surfaces for the carton, said blank having
a main top wall panel, a main bottom wall panel, and a top cover,
a first side wall panel between the main top and bottom panels, and a second side wall panel between the main bottom panel and said top cover,
each of said main panels having at each opposite end a 3-panelled end flap including a major centrally disposed end wall panel having a length transverse to said main panel ends and a pair of minor reinforcement members, one on either side of the end wall panel,
said top cover having at each opposite end a two-panelled end cover flap including an end wall cover panel adjacent said top cover and a cover brace panel outwardly thereof,
the end wall cover having a length transverse to said end of said top cover not exceeding substantially said length of a larger one of said end wall panels, so that the cover brace panel is placed into facially abutting relation to one of the minor reinforcement panels and into edgewise abutting relation to one of said end wall panels adjacent thereto,
whereby in assembled form there are provided quadruple thickness end corners, double thickness end walls, and spaced end covers to protect the contents of the carton, said end covers accommodating an L-shaped sealer machine for application of a sealing tape to right angle surfaces at junctions of the bottom wall panel and the end covers.

4,090,609
HANDLE ASSEMBLY FOR DISK CARTRIDGES AND THE LIKE

Edgar A. Rager, 5746 Canna La., San Jose, Calif. 95124

Filed Apr. 21, 1977, Ser. No. 789,359
Int. Cl.[2] B65D *85/30*
U.S. Cl. 206—444 10 Claims



1. In a handle of the type used in a cover of disk cartridges or similar containers, wherein the handle is adapted to be held by a human hand and is rotatably connected to said cover the improvement comprising,

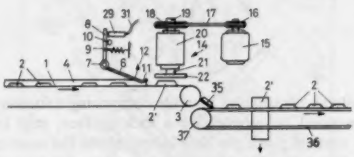
a housing member rotatably hinged between opposed handle arms, said rotatable housing member having means for selectively latching said housing member to an arm of a container handle, said rotatable housing member disposed adjacent to a cover of said container, and

at least one pivot member nested in a pivot socket defined within a plate of said housing, said pivot member adapted for connection through said housing to a liftable member beneath the cover of said container.

4,090,610
APPARATUS FOR REJECTING EXCESSIVELY THICK ARTICLES

Pierre Luginbühl, Neuhausen am Rheinfall, Switzerland, assignor to Sig Schweizerische Industrie-Gesellschaft, Neuhausen am Rheinfall, Switzerland

Filed Apr. 5, 1977, Ser. No. 784,792
Claims priority, application Switzerland, Apr. 9, 1976, 4548/76
Int. Cl.[2] B07C *1/10*
U.S. Cl. 209—74 R 11 Claims



1. An apparatus for eliminating excessively thick elongated articles medially positioned on and advanced by a first conveyor means in an orientation transverse to the direction of advance comprising

(a) a sensor means arranged above said first conveyor means and responding to an article having a thickness exceeding a predetermined magnitude;

(b) an impact means connected to said sensor means and having a striker means positioned for delivering a blow to the excessively thick article for shifting the same into an eccentric position on and with respect to said first conveyor means; said impact means further having actuating means operating said striker means upon receipt of a signal of response from said sensor means;

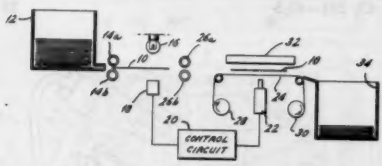
(c) second conveyor means formed of two parallel narrow conveyor belts extending from a discharge end of said first conveyor means; the distance between said conveyor belts being less than the length of the articles; and

(d) an arrangement for transferring the articles from said discharge end of said first conveyor means onto said second conveyor means for effecting further conveyance of the medially arranged articles by said second conveyor means by a stable engagement of the medially arranged articles with both conveyor belts and for effecting a drop-out of the eccentrically arranged articles by an unstable engagement of the eccentrically arranged articles with said second conveyor means.

4,090,611
METHOD AND APPARATUS FOR SORTING DOCUMENTS

Gordon W. McKinney, Souderton, Pa., assignor to Pheripheral Sciences, Inc., Norristown, Pa.

Continuation of Ser. No. 575,071, May 6, 1975, abandoned. This application Oct. 12, 1976, Ser. No. 731,802
Int. Cl.[2] B07C *5/344*
U.S. Cl. 209—111.8 5 Claims



1. Apparatus for sorting a bundle of envelopes according to particular information contained in documents within said envelopes, said apparatus comprising:

means for sensing a storage medium to extract said particular information;

means responsive to said sensing means for depositing iron particles on said documents in discrete locations corresponding to a coded format of said sensed information;

means for depositing said documents individually in envelopes;

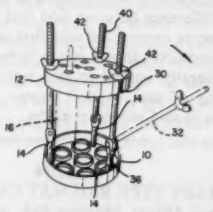
means for magnetically sensing said documents to extract said particular information;

and means responsive to said magnetic sensing means for sorting said envelopes in accordance with a predetermined pattern.

4,090,612
METHOD AND APPARATUS FOR TINTING CAULK

Rollie Lostutter, 4340 Poplar Creek Rd., Vandalia, Ohio 45377, assignor to Rollie Lostutter, Vandalia, Ohio

Filed Jan. 5, 1977, Ser. No. 756,784
Int. Cl.[2] B01F *15/00*
U.S. Cl. 211—13 3 Claims



1. A caulk tinting apparatus for use in tinting caulk which has been prepackaged in cylindrical caulking tubes having a removable piston in one end of the tube and a fixed nozzle extending from an opposite end the apparatus being securable in a reciprocating mixer of the type used for mixing paint and the like, the apparatus comprising:

a base member having a plurality of spaced cylindrical

flanges disposed perpendicular to the base members each flange matingly receiving said one end of one of said caulking tubes;

a top member disposed in spaced parallel relation to said base member and having a plurality of openings defined therein one each in registry with each of said flanges for mating engagement with the fixed nozzles extending from each said caulk tube; and

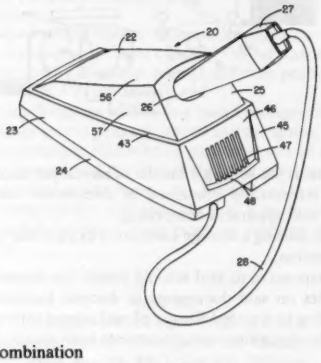
means removably securing said top member to said bottom member with said caulk tubes engaged in said flanges and openings.

4,090,613

STORAGE DEVICE

Bruce M. McPherson, Ithaca, N.Y., assignor to NCR Corporation, Dayton, Ohio

Continuation of Ser. No. 625,400, Oct. 24, 1975, abandoned.
This application Feb. 22, 1977, Ser. No. 771,054
Int. Cl.[2] A47F *7/00*
U.S. Cl. 211—69.5 **18 Claims**



1. In combination

(a) a manually manipulated data pen;

(b) means for orientating said data pen in a plurality of mounted positions including a first support means having a supporting surface at a first angle from a reference plane;

(c) a second support means for supporting the manually manipulated data pen at a second angle from said reference plane;

(d) means for mounting said second support means in a plurality of positions on the supporting surface of said first support means, said second support means when mounted in a first position on said first support means supporting said data pen at an angle from said reference plane which is equal to the sum of the said first and second angles and when mounted in a second position on said first support means supporting said data pen at an angle which is equal to the difference between said first and second angles;

(e) and means carried by said first support means for enabling said first support means to be maintained in a position generally normal to said reference plane when the mounting of said support means on said first support means is in said second position.

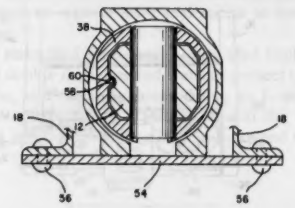
4,090,614

ROTARY TYPE RAILWAY CAR COUPLER

Russell George Altherr, Munster, Ind., and John Walter Kaim, Chicago, Ill., assignors to Amsted Industries Incorporated, Chicago, Ill.

Filed Oct. 4, 1976, Ser. No. 729,050
Int. Cl.[2] B61G *1/00*
U.S. Cl. 213—62 A **1 Claim**

1. Rotary type railway vehicle coupler arrangement comprising a yoke having a cylindrical bore, a yoke collar rotatably seated in said cylindrical bore, said yoke collar having a diametrically extending pin hole extending through said bore and having a pin seat flange adjacent one end thereof, a coupler comprising a coupler shank received in said yoke collar and having an opening axially alignable with said pin hole, said coupler including a coupling head having a top side and a bottom side, a substantially semi-hemispherical projection formed on said yoke collar and a groove of substantially semi-



circular cross section formed in said coupler shank for receiving said substantially semi-hemispherical projection and located such that said coupler head bottom side is on the same side as said pin seat flange, and pin means extending through said aligned pin hole and shank opening for connecting said coupler shank for rotation with said yoke collar, said projection being located so as to permit freedom of horizontal and vertical movement of the coupler shank.

4,090,615

COUPLER KNUCKLE ASSEMBLY

Albert Edward Martin, Lancaster, N.Y., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Sep. 17, 1976, Ser. No. 723,853
Int. Cl.[2] B61G *3/00*
U.S. Cl. 213—151 **8 Claims**

1. A railway car coupler knuckle comprising a forward nose and a rearward tail containing a locking face, said knuckle having a vertical pivot pin hole intermediate the nose and tail for receiving a pin for connnecting the knuckle to a coupler head, the improvement comprising the knuckle tail having a curvature in which the radial distance from the pivot pin hole center to the rear edge gradually decreases as it approaches the locking face.

4,090,616

BALE LOADER

John G. Runyan, Easton, Mo. 64443, and James H. Kline, Agency, Mo. 64401

Filed Jan. 10, 1977, Ser. No. 758,013
Int. Cl.[2] B65G *67/02*
U.S. Cl. 214—1 HH **4 Claims**

1. Apparatus for handling a large bale of hay, said apparatus comprising:

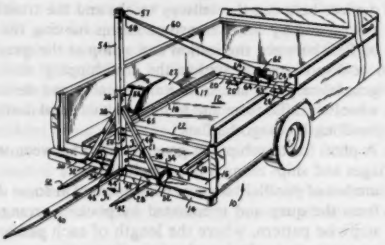
a support member adapted to be coupled with a vehicle for pivotal movement about a generally horizontal pivot axis;

a substantially upright post structure coupled with said support member for movement therewith about said pivot axis;

a sleeve member mounted on said post structure for up and down sliding movement thereon between a plurality of spaced apart positions without removing said sleeve member from the post structure;

means for releasably securing said sleeve member at each of said spaced apart positions on said post structure;

a spear member for piercing a hay bale,



said spear member being rigidly coupled with said sleeve member to move with said support member and post structure in a manner to raise and lower the bale in response to pivoting of said support member about its pivot axis; and

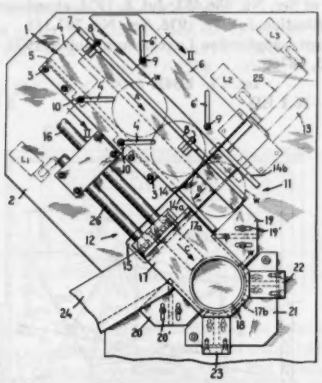
power means for pivoting said support member about its pivot axis in a direction to raise the bale from the ground for transport.

4,090,617

LOADING AND UNLOADING DEVICE FOR A WORKPIECE

Shinichi Kikuchi, Narashino, Japan, assignor to Seiko Seiki Kabushiki Kaisha, Japan

Filed Feb. 9, 1977, Ser. No. 767,052
Claims priority, application Japan, Feb. 10, 1976, 51-13595
Int. Cl.² B65G *47/90*
U.S. Cl. 214—1 BB **4 Claims**



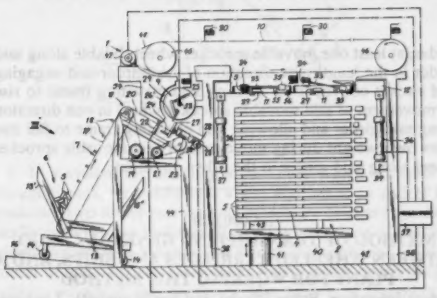
1. A workpiece loading and unloading device for a machine comprising a base plate, a downwardly extending workpiece feeding magazine chute mounted on said base plate and having an exit at its lower end, a first workpiece carrier reciprocable on said base plate in a direction perpendicular to said magazine chute between a first position for receiving a workpiece from the exit of said magazine chute and a second position, means for reciprocating said first workpiece carrier between said first and second positions, a second workpiece carrier reciprocable on said base plate between an initial position for receiving said workpiece from said first workpiece carrier and a working location of said machine, means for reciprocating said second workpiece carrier in timed relation with the reciprocation of said first workpiece carrier, means for chucking said workpiece in said working location while still held by said second workpiece carrier, said second workpiece carrier comprising means for withdrawing said workpiece from said working location in returning toward said initial position and means for discharging said workpiece from said second workpiece carrier upon withdrawal.

4,090,618

DEVICE FOR INSERTING SPACING STRIPS BETWEEN BOARDS TO BE STACKED

Manfred Lehmann, Singen, Germany, assignor to Ludwig Bollmann KG, Rielasingen, Germany

Filed May 27, 1976, Ser. No. 690,523
Claims priority, application Germany, May 27, 1975, 2523301
Int. Cl.² B65G *57/26*
U.S. Cl. 214—6 M **20 Claims**



1. In a board-stacking apparatus including a vertically movable platform on which boards are successively piled to form a stack, with the uppermost board held at a given level by an intermittent descent of said platform between stacking cycles, the combination therewith of a device for inserting spacing strips between said boards during the formation of said stack, said device comprising:

storage means for accumulating a plurality of spacing strips to be inserted between boards of the stack;

input means including a lifting conveyor for supplying successive spacing strips to said storage means;

transport means for delivering spacing strips from said storage means to an area above said platform for deposition on boards piled thereon;

transfer means for periodically removing accumulated spacing strips from said storage means to said transport means; and

timing means for correlating the operation of said transfer and transport means with said stacking cycles;

said input means further comprising a cradle with upwardly diverging cheeks bracketing the lower end of said lifting conveyor for guiding a supply of spacing bars thereto, said cradle being provided with a carriage riding on a sloping surface, said cheeks being mounted on said carriage for movement of one of said cheeks by gravity toward a rising side of said lifting conveyor with progressive contraction of a trough formed between said rising side and said one of said cheeks.

4,090,619

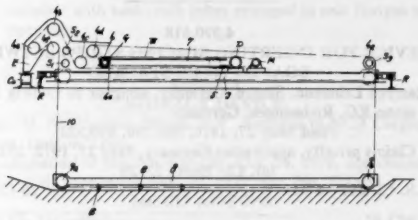
MACHINE FOR SCRAPING UP GRIT

Minoru Higuchi, and Tetuo Yamagata, both of Amagasaki, Japan, assignors to Hitachi Kiden Kogyo Ltd., Amagasaki, Japan

Filed Aug. 10, 1976, Ser. No. 713,220
Int. Cl.² B65G *65/38*
U.S. Cl. 214—16 R **6 Claims**

1. A grit scraping machine comprising a girder movably

mounted for travelling freely over grit chambers; an elevating frame parallel with said girder and movable relative to said girder to ascend and descend between the bottom and upper part of the grit chambers; sprocket wheels at both ends of said elevating frame and at a plurality of fixed positions above said girder; an endless bucket conveyor extending around said sprocket wheels and suspending said elevating frame from said



girder; at least one movable sprocket wheel slidable along said girder in the lengthwise direction of said girder and engaging said bucket conveyor for causing said elevating frame to rise by movement of said movable sprocket wheel in one direction along said girder and allowing said elevating frame to fall due to its own weight during movement of said movable sprocket wheel along said girder in the other direction.

4,090,620

METHOD OF TRANSHIPPING GENERAL CARGO BETWEEN WHEELED CARRIAGES AND SHIPS, AND A PLANT FOR WORKING THIS METHOD

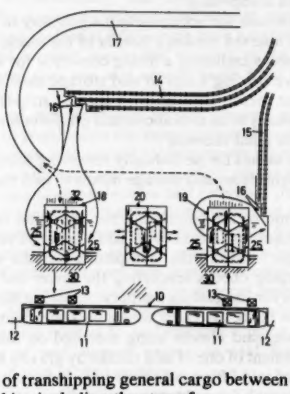
Anders Johansson, Bohus Bjorko, and Per Strombeck, Lindome, both of Sweden, assignors to Salen & Wicander Terminalsystem AB, Vastra Frolunda, Sweden

Filed Feb. 25, 1977, Ser. No. 772,243

Claims priority, application Sweden, Feb. 27, 1976, 7602612

Int. Cl.² B65G *1/06*

U.S. Cl. 214—16 B **4 Claims**



1. A method of transhipping general cargo between wheeled carriages and ships including the step of

(a) arranging a number of railway tracks in parallel relationship at a distance from a quay and terminating each railway track at a pocket forming part of a stepwise pattern, where each pocket has a length about corresponding to a railway waggon whereby railway waggons are transported to and from said tracks by transport devices,

(b) providing at least one transhipping station between said railway tracks and the quay and spaced apart therefrom, said station being defined by at least three sides, and having a horizontal platform,

(c) forming the ground level surrounding said station so said platform, along at least one of said sides will be located at a vertical distance above the adjacent ground level corresponding to the measure between said level and the floor of a railway waggon mounted upon a transport device, and further, along at least a second of said sides forming the ground level so the vertical distance between the platform and the ground corresponds to the height of a cargo-bigflat,

(d) moving railway waggons by means of said transport devices between the railway tracks and the transhipping station and by other transport means moving the cargo-bigflats between the station and a ship at the quay, and

(e) re-dispositioning, within the transhipping station, the general cargo to and from units suitable and destined for wheeled traffic from and to units suitable and destined for handling by cargo-bigflats.

3. A plant for transhipping general cargo between wheeled carriages and ships along a quay including

a number of parallel railway tracks located at some distance from the quay and terminated by pockets arranged in a stepwise pattern, where the length of each pocket about corresponds to the length of a railway waggon whereby railway waggons are transported to and from said tracks by transport devices, and

at least one transhipping station located between said railway lines and the quay and spaced apart therefrom, said station being defined by at least three sides and having a horizontal platform with the surrounding ground level so disposed with respect to the horizontal platform, that the vertical distance between the platform and the ground level along at least one of said sides corresponds to the measure between said level and the floor of a railway waggon mounted upon a transport device, while the vertical distance between the ground level and the platform along at least a second of said sides thereof corresponds to the height of a cargo-bigflats.

4,090,621

APPARATUS FOR THE SUPERIMPOSED STORAGE OF VEHICLES

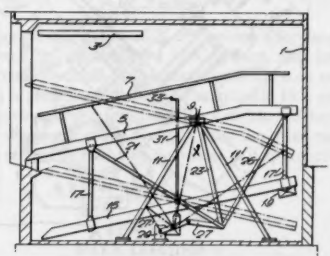
Jean-Claude Parent, Boulevard Piercot, 14, 4000 Liege, Belgium

Continuation of Ser. No. 486,483, Jul. 8, 1974, abandoned. This application Jul. 21, 1976, Ser. No. 707,311

Claims priority, application Luxembourg, Jul. 9, 1973, 67965; Nov. 11, 1973, 68760

Int. Cl.² E04H *6/06*

U.S. Cl. 214—16.1 ED **3 Claims**



1. Apparatus for use in the superimposed storage of vehicles comprising:

housing means, said housing means defining an enclosed storage area;

a first pivotal platform including a pair of oppositely disposed ends, a pair of sides, and a geometric axis located intermediate said oppositely disposed ends and passing through said sides;

leg means mounted within said storage area and including means for pivotally supporting said first platform at said axis;

a second platform, said second platform including oppositely disposed ends and sides;

means pivotally suspending said second platform beneath said first platform whereby said second platform will move with said first platform;

a pair of elongated side members connected at their respective first ends to each side of said first platform, said side members being operative to facilitate movement of said platform between a first operative position wherein a first end of said first platform is positioned for receiving vehicles and a second operative position wherein the first end of said first platform is disposed above the said vehicle receiving position and a first end of said second platform is positioned to receive a vehicle to be stored, said side members being connected to each side of said first platform at a pair of points spaced on opposite sides of said geometric axis;

means connecting the second ends of said side members to a common point below at least a portion of said second platform;

counterweight means mounted on said second platform, said geometric axis and points and counterweight means being located so as to place said first and second platforms substantially in an equilibrium balanced position in either of their operative positions with the said geometric axis located above the center of gravity of the combination of said first and second platforms;

a source of mechanical power, said power source having a displaceable output member; and

means interconnecting said power source output member and said second ends of said side members, said interconnecting means transmitting pivotal motion to said first platform via said side members whereby said first platform is caused to pivot about said geometric axis between said first and second operative positions.

4,090,622

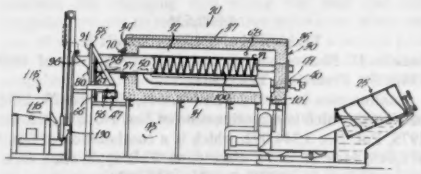
ROTARY RETORT FURNACE

Jonathan Smith, Glen Ellyn, Ill.; Robert C. Larko, and Eugene E. Booth, both of Meadville, Pa., assignors to Sunbeam Equipment Corporation, Meadville, Pa.

Division of Ser. No. 615,281, Sep. 22, 1975, Pat. No. 4,025,297. This application Oct. 26, 1976, Ser. No. 735,728

Int. Cl.² F23K *3/00*

U.S. Cl. 214—18 K **12 Claims**



4. A rotary retort furnace comprising an outer shell, a rotating retort extending into said shell, said retort having a charge end and a discharge end, said charge end having a closable opening for receiving parts to be heat treated, closure means for said opening including door means normally biased to a closed position, cam means for urging said door means open at a preselected point in time in the operation of said retort for a preselected length of time, loading means including hopper means for holding parts to be heat treated in said furnace, delivery means for conveying parts from said hopper means to said furnace, means for supplying said delivery means with a charge of parts of a preselected weight from said hopper means, electrically operated means for moving said parts from said hopper means into said delivery means, said delivery means being movable between a parts receiving and a parts dumping position, and control means for synchronizing movement of said delivery means into said parts dumping position with said cam means urging said door means open.

4,090,623

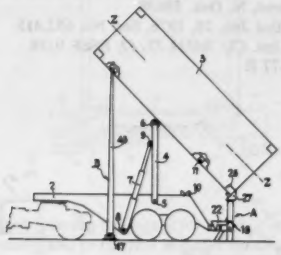
SYSTEM FOR HANDLING A CONTAINER

Gustave Maurice Noyon, Paris, France, assignor to Societe Internationale d'Investissements et de Participations par abreviation Interpar, Paris, France

Filed Feb. 22, 1977, Ser. No. 770,763

Int. Cl.² B65G *67/30*

U.S. Cl. 214—38 D **20 Claims**



1. In a system for handling a container which is usable as storage means, for example as a silo, and has at an end of the container two lower rear corners which are disposed symmetrically with respect to a median longitudinal plane of the container containing a longitudinal axis of the container, each of which corners defines three faces, said system comprising a vehicle on which the container may bear in a transporting position of the vehicle in which transporting position a pivotal connection between the container and the vehicle enables the vehicle to pivot about an axis and said longitudinal plane is coincident with a median longitudinal plane of the vehicle, jack means combined with support means carried by the vehicle and cooperative with the container for selectively raising and lowering the container by pivoting the container about said axis of pivotal connection, and a fixed installation for receiving the container in a position of use of the container, and comprising means for locking a central region of a rear end of the vehicle, after the vehicle has moved rearwardly toward the installation, the improvement comprising the following features:

the fixed installation comprises a frame contained in a median longitudinal plane of the installation and the position of use of the container is an inclined position in which inclined position a lower end portion of the container is set in position in the frame by said corners;

the axis of the pivotal connection between the container and the vehicle is embodied by two articulations, each of which articulations comprises a male element having a surface of revolution about a horizontal axis and a female element comprising a conjugate surface of revolution and divergent surfaces connected to the surface of revolution of the female element, said elements being laterally mounted symmetrically relative to said longitudinal plane of the vehicle, one element being mounted on the container and the other element on the vehicle, and being, under the effect of the force of gravity in mutual supporting relation by their surfaces of revolution for the transporting position and in the course of the pivoting corresponding to the start of the raising operation, while being disengageable from each other in the course of said raising operation;

the frame of the fixed installation comprises two fixed cradles disposed symmetrically with respect to said median longitudinal plane of the installation, each of the cradles comprising a front bearing surface and a rear bearing surface which are offset longitudinally of the installation and are conjugate to a corresponding one of said two

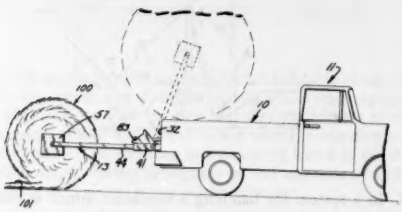
corners of the container to ensure, after the locking of the central region of the rear of the vehicle and during the raising, the angular movement of the container, the self-centering of the container, that is to say the putting of said median longitudinal planes of the container and the installation into coincidence, and the setting of the container in the inclined position of use.

4,090,624

ROUND BALE TRANSPORTER

Vernon R. Krein, and Lawrence D. Elmer, 425 South Grove, both of Hebron, N. Dak. 58638

Filed Jan. 26, 1976, Ser. No. 652,415
Int. Cl.[2] B65H *75/42*; B66F *9/18*
U.S. Cl. 214—77 R **2 Claims**



1. In a bale transporter, in combination:
a generally horizontal frame;
a shaft pivoted in said frame about a horizontal axis;
a pair of arms pivoted at first ends near the opposite ends of said shaft, respectively;
bale piercing axle means at the ends of said arms directed toward one another;
first hydraulic means for causing pivotal movement of said arms toward and away from one another;
and second hydraulic means, including a lost motion mechanism, for causing pivotal movement of said shaft through a range of greater than 90°, so that said arms may move from a position below the horizontal to a position beyond the vertical, said lost motion mechanism including;
a crank arm secured to said shaft and having a pair of opposed abutments angularly spaced about a center;
link means pivoted at one end to said crank arm at said center;
a hydraulic actuating member movable generally orthogonally with respect to said shaft;
and means pivotally connecting said link means to said actuating member in a position to engage either of said abutments as determined by the pivotal movement of said link means with respect to said crank arm.

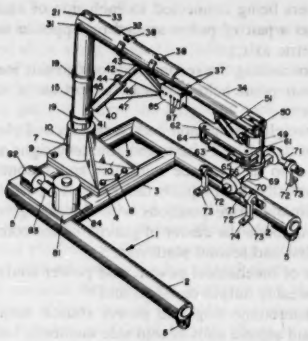
4,090,625

PORTABLE HYDRAULIC HOIST FOR VEHICULAR ENGINES

Jerry Walters, 7855 Fox Trot Dr., Colorado Springs, Colo. 80908

Filed Jan. 10, 1977, Ser. No. 758,163
Int. Cl.[2] B60P *1/48*
U.S. Cl. 214—77 R **9 Claims**

1. A portable hydraulic hoist for vehicular engines comprising a base frame, supporting wheels for said frame, interrelated motor, hydraulic pump, and oil reservoir tank means on said base frame, socket means on said frame at one end thereof and having an outer main cylindrical boom member vertically arranged therein, an inner vertical boom member sleevably positioned in said outer boom member, hydraulic cylinder means in said inner boom member and connected to said socket means and to the upper end of said outer boom member, and outer cylindrical horizontally disposed boom member pivoted to said outer vertical boom member, an inner horizontally disposed boom member sleeved in said outer horizontal boom member, hydraulic cylinder means in said inner horizontal boom member and anchored thereto and to said outer horizontal boom member means on said vertical and horizontal boom members to retain alignment during extensible movements thereof, hydraulic cylinder means extending between said outer vertical and horizontal boom members, a downwardly cylindrical depending member pivoted to the outer end of said inner horizontal boom member, engine supporting bracket saddle shaft means sleeved and rotatably arranged in said depending cylindrical member, transverse shaft means supported by said saddle shaft means and having cross shaft means at the opposing ends thereof, angularly adjustable engine sling



arms depending from the ends of said cross shafts for bolting connection to an engine being handled, hydraulic cylinder means extending between said inner horizontal boom and said depending members, hydraulic cylinder means interconnected to said depending member and said engine supporting bracket saddle shaft means, a control panel having valve and valve actuating means therein and thereon, and hydraulic lines extending between said control panel, said cylinders and said pump and oil reservoir tank means whereby selected vertical movement of said vertical boom, extensible movement of said horizontal boom, and tilting and rotational movements of said depending member and said engine supporting bracket saddle shaft means is hydraulically controlled by actuation of said valve actuating means to raise and lower said engine.

4,090,626

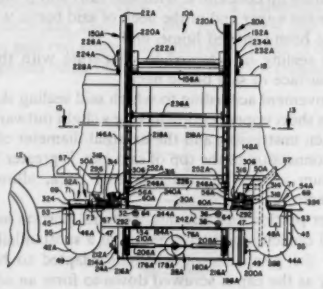
TRASH HANDLING DEVICE

Franklin D. Ebeling, and Ernest C. Ebeling, both of 1608 W. 24th St., Plainview, Tex. 79072

Continuation-in-part of Ser. No. 644,768, Dec. 29, 1975, abandoned, which is a continuation of Ser. No. 546,277, Feb. 3, 1975, Pat. No. 3,944,092, which is a continuation of Ser. No. 471,845, May 21, 1974, abandoned. This application Oct. 18, 1976, Ser. No. 733,083
Int. Cl.[2] B65F *3/02*
U.S. Cl. 214—302 **9 Claims**

1. In combination with a vehicle having an elevated access opening, apparatus for emptying refuse into the vehicle through said access opening, comprising:
a refuse container for holding said refuse, said refuse container having a pair of sidewalls and a container support arm affixed to each of said sidewalls, each support arm having a free end extending to a position in front of said container, and a roller rotatably mounted on each of said free ends of said support arms, the axis of rotation of each roller being normal to the longitudinal axis of its associated arm;
elevator means including an endless carrier for raising and lowering said container; and
container-engaging means connected to said endless carrier, said container-engaging means including a U-shaped sup-

port member having an upwardly-facing, open-throat portion for engaging a part of the free end of each of said



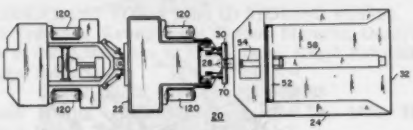
container support arms behind its roller said part being is between the roller and the container.

4,090,627

SCOOP CAR

John J. Teti, Saltville, Va., assignor to Pyott-Boone Machinery Corporation, Saltville, Va.

Filed Apr. 23, 1976, Ser. No. 679,721
Int. Cl.² B60P *1/18*
U.S. Cl. 214—506 **17 Claims**



1. A mine vehicle comprising:
a scoop car;
a self-powered tractor having said scoop car pivotally connected thereto for moving said scoop car;
a pair of wheels movable between a lowered position, supporting said scoop car, and a raised position, not supporting said scoop car;
bolster means provided on the mine vehicle having a first position, for engaging said scoop car and said self-propelled tractor to restrict relative movement when said pair of wheels are in a raised position, and a second position not engaging both said scoop car and said self-propelled tractor to permit relative movement when said pair of wheels are in a lowered position;
a cutting edge formed on the open end of said scoop car; and,
a wear plate formed beneath said cutting edge to maintain said cutting edge slightly above ground to facilitate loading without digging in of said cutting edge.

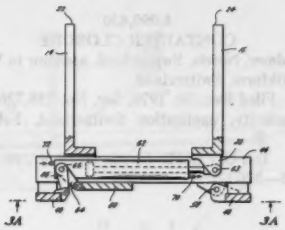
4,090,628

FORKLIFT CLAMPS

Stuart W. Sinclair, Lake Jackson, Tex., assignor to Anderson, Clayton & Co., Houston, Tex.

Filed Sep. 7, 1976, Ser. No. 720,919
Int. Cl.² B66C *1/44*
U.S. Cl. 214—655 **14 Claims**

1. A clamp for use on a lift truck for supporting one or more flat sided objects comprising,
a vertical frame for attachment to the lift truck,
first and second arms extending horizontally outwardly from the frame and supported from the frame, said arms being single piece members having inner and outer ends and having generally flat outsides and insides extending from the inner ends to the outer ends and a thin cross section whereby the arms may readily move into and out of small spaces,
means connected to the frame for moving at least one of the arms horizontally toward the other arm,
at least the first arm being pivotally connected at its inner end to the frame,
means for rotating said pivoting arm about said pivot inwardly includes a hydraulic cylinder, pivoting linkage



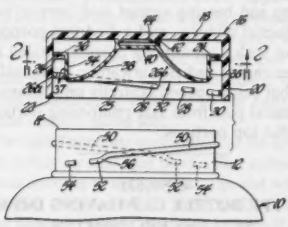
connected between the means for moving one of the arms horizontally and to the first arm, for simultaneously moving the outer ends of the arms by rotation and horizontal movement towards each other for increasing the equalization of the gripping pressure of the flat insides of the arms on a flat sided object from the inner ends to the outer ends of the arms, and outwardly for providing an operating clearance between the outer ends of said arms and objects for allowing engaging or disengaging an object.

4,090,629

SPIRAL LOCK SAFETY CLOSURE

Peter Hedgewick, Windsor, Canada, assignor to International Tools (1973) Limited, Windsor, Canada

Filed Aug. 22, 1977, Ser. No. 826,493
Int. Cl.² B65D *53/00, 55/02*
U.S. Cl. 215—214 **3 Claims**



1. A safety closure assembly comprising: a cap having an end wall with a skirt projecting axially from the periphery thereof and having a free end spaced axially from said end wall with cap locking means formed on the inner surface of the skirt adapted to be engaged with and disengaged from complementary container locking means on a container by combined axial and rotary motion of the cap relative to the container; a spring and sealing member for sealingly engaging a container to which the cap is adapted to be applied and at the same time biasing the cap locking means into locked engagement with the container locking means, said spring and sealing member including an axially extending sealing surface adapted to be received in the mouth of the container for sealing engagement with the inner surface thereof; retention means on the cap for preventing axial separation of said spring and sealing member from said cap; said cap locking means including at least two sets of cap locking elements, each set of cap locking elements being disposed in a helical path on the inner surface of said skirt and extending from a trailing end to a leading end in the direc-

tion from said end wall to the free end of said skirt, each set of cap locking elements including an elongated thread-like rib having a trailing end located at the trailing of said helical path and a leading end; said cap locking elements further including a pair of spaced locking lugs, the first of which is located at the leading end of said helical path and the second one of which is located between and spaced from said first lug and the leading end of said thread-like rib.

4,090,630

CONTAINER CLOSURE

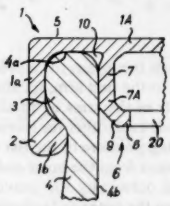
Walter Wiedmer, Nafels, Switzerland, assignor to Walter Wiedmer Plastikform, Switzerland

Filed Dec. 30, 1976, Ser. No. 755,726

Claims priority, application Switzerland, Feb. 16, 1976, 1873/76

Int. Cl.[2] B65D *41/16, 41/18, 41/46*

U.S. Cl. 215—320 **6 Claims**



1. A container closure, comprising a container having an open mouth, a rim formation around the mouth having an exterior bead formation and an interior wall, a cap having a flat top portion overlying the mouth and having an annular skirt portion extending downwardly from the periphery of said flat top portion and engaged over said bead formation and having a lower internal bead engaged against the exterior of said container below said bead formation, said cap having a substantially cylindrical central part depending from the interior of said flat top and bearing against said interior wall of said receptacle adjacent said rim, said cylindrical portion having a lower free end with a reinforcing portion parallel to said flat top portion extending radially inwardly from said container interior wall but being opened centrally on the interior of said cylindrical central part from said reinforcing portion substantially to said flat top portions.

4,090,631

SCREW-TYPE BOTTLE CAP HAVING IMPROVED SEALING PROPERTIES

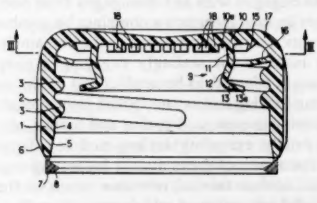
Jean Grussen, "La Noue" Mondreville, 78114 Longnes, France

Filed Jan. 31, 1977, Ser. No. 764,069

Claims priority, application France, Feb. 3, 1976, 76 02959; Nov. 29, 1976, 76 35968

Int. Cl.[2] B65D *41/04*

U.S. Cl. 215—329 **8 Claims**



1. In a screw-type bottle cap molded in one piece from plastic material and comprising

an internal sealing skirt depending from the top of said cap and adapted to be force-fitted into the externally threaded neck of a bottle,

a first sealing lip concentric with said skirt and positioned to engage the upper end of the neck of said bottle when said cap has been screwed home, and

a second sealing lip adapted to cooperate with the upper outer surface of said bottle neck,

the improvement according to which said sealing skirt comprises a short upper portion having a slight outward conicity when unstressed, and the external diameter of which, at its connection to the top of said cap, is greater than the maximum internal diameter of said neck, allowing for manufacturing tolerances,

said upper portion merging into a central portion having an inward conicity, and terminating in a substantially radial collar, the periphery of which is adapted to bend upwardly as the cap is screwed down to form an additional seal with the inner surface of said bottle neck,

and said second sealing lip is circular, circumferentially continuous, and adapted to cooperate with a smooth portion of said bottle neck above the threads thereon.

4,090,632

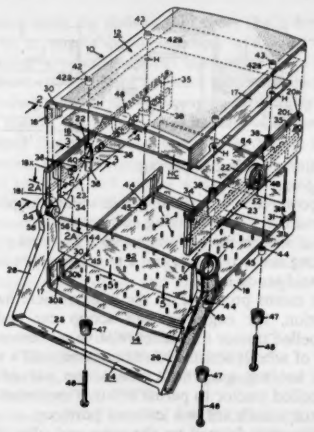
ADJUSTABLE INSTRUMENT CASE

Fred L. Katzmann, Cedar Grove, N.J., and Dale W. Gruye, Portola Valley, Calif., assignors to Ballantine Laboratories, Inc., Boonton, N.J.

Filed Jan. 17, 1977, Ser. No. 759,670

Int. Cl.[2] B65D *7/00;* H02K *5/04*

U.S. Cl. 220—4 R **23 Claims**



1. An electrical instrument case, adjustable in one of its dimensions, comprising a pair of panels each having a pair of flanges at opposite margins of the panel with each of the flanges of a panel projecting to the same side of the panel and toward the flanges of the other panel, and a pair of members each having an inner wall and an outer wall which are spaced by the thickness of a flange of a panel to form an elongated channel to adjustably and telescopically receive a flange of each panel.

4,090,633

COLLAPSIBLE PALLET CONTAINER

Antoine Trubiano, Pointe aux Trembles, Canada, assignor to Cari-All Inc., Montreal, Canada

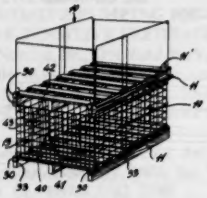
Filed Sep. 23, 1977, Ser. No. 835,864

Int. Cl.[2] B65D *7/24, 7/20, 9/12*

U.S. Cl. 220—6 **10 Claims**

1. A collapsible container side wall for use with a material support pallet; said container side wall having a front panel, a

rear panel and two side panels interconnected between opposed end edges of said front and rear panels by a respective hinge connection; each said side panels having two panel sections interconnected to each other by a transverse hinge located intermediate said front and rear panels and extending parallel to said end edges, said transverse hinge of one of said two side panels being offset laterally from the transverse hinge



of the other side panel whereby said panel sections can fold inwardly with one side panel on top of the other between said front and rear panels with these latter panels collapsing towards each other, and retention means in a lower edge of said container side wall to prevent lateral displacement of said container side wall when positioned about a peripheral area of said pallet.

4,090,634

CLOSURE CAP FOR A LIQUID STORING VESSEL

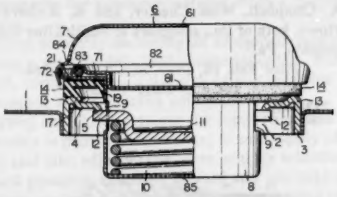
Tsuneo Tsukisaka, Kawagoe, and Sigehiro Maruoka, Oomiya, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 25, 1977, Ser. No. 818,605

Claims priority, application Japan, Jul. 26, 1976, 51-99440[U]; Jul. 26, 1976, 51-99441[U]

Int. Cl.² B65D *41/06, 41/16*

U.S. Cl. 220—302 **28 Claims**



1. A closure cap device for a liquid storing tank which comprises in combination:

(a) a liquid storing tank having a liquid filling port formed in one part thereof;

(b) a closure cap to close said liquid filling port;

(c) a sealing member interposed between the lower surface of said closure cap and a flanged part formed on said liquid filling port, said sealing member being in such a configuration that is composed integrally of a ring-shaped raised part formed on the flanged part of said liquid filling port of said liquid storing tank, a ring-shaped flat plate part to intimately contact with the lower surface of said closure cap, a ring-shaped lip part below the lower part of said ring-shaped flat plate part and integrally joined thereto by a connecting part and intimately contacted with a peripheral surface of said ring-shaped raised part, and a ring-shaped slit formed in the inner peripheral surface of said connecting part and between the lower surface of said flat plate part and the upper surface of said lip part.

4,090,635

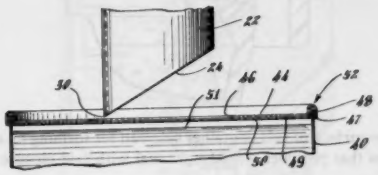
EASILY PERFORATABLE CONTAINER TO FACILITATE DISPENSING OF CONTENTS

Evan S. Nelson, Iron Mountain, and Charles J. Nelson, Kingsford, both of Mich., assignors to The Nelson Company, Iron Mountain, Mich.

Continuation of Ser. No. 569,368, Apr. 18, 1975, abandoned. This application Jul. 13, 1976, Ser. No. 704,926

Int. Cl.² B65D *51/22*

U.S. Cl. 220—258 **8 Claims**



1. An improved can structure of the type capable of serving as a reservoir for liquid contents to be dispensed by conduit means communicating with the interior of the can, said can structure having a cylindrical can body terminating in an upper edge with a flat rigid metal top which is adapted to be secured to the upper edge of said can body by crimping thereto, the improvement in the can structure comprising:

said flat rigid metal top being of annular configuration having a central opening therein,

said central opening being in the size range of approximately 20 to 65 percent of the diameter of said annular metal top,

said upper edge of the can body engaging a thin plastic film tautly stretched across said upper edge,

said thin plastic film being more readily perforatable than said annular metal top,

said thin plastic film extending outwardly beyond the upper edge of the can body and beyond the periphery of said annular metal top,

said annular metal top being sealed to the upper edge of the can body by a usual rim bead crimping operation with said thin plastic film being sandwiched between the crimped periphery of the annular top and the crimped upper edge of the can body, whereby said thin plastic film extends across and immediately adjacent to the entire undersurface of the annular metal top,

whereby the liquid contents are retained in the improved can structure solely by said thin plastic film extending across the central opening in said annular top, and whereby easy access to the contents of the improved can structure is provided because the thin plastic film is readily perforatable.

4,090,636

METAL PAINT PAIL COVER

Bernard W. Norton, Moraga, Calif., assignor to B.W. Norton Manufacturing Co. Inc., Oakland, Calif.

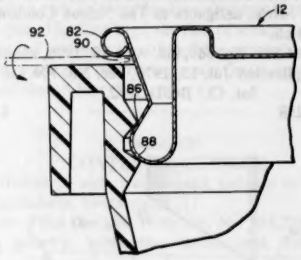
Filed Aug. 22, 1977, Ser. No. 826,559

Int. Cl.² B65D *39/00*

U.S. Cl. 220—307 **9 Claims**

1. A container made of plastic material in combination with a closure made of metal, said container comprising a body with a continuous sidewall, an integral bottom section and an open top, for receiving said closure, a first and upper ridge member and a second or lower ridge member spaced below on the

inside surface of said sidewall near said open top, said ridge members being integral with and extending inwardly from the



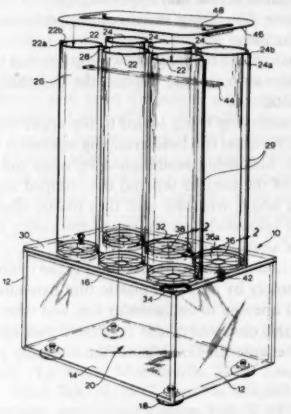
inside surface of said container sidewall for forming an annular recess that provides a fluid tight seal with said closure.

4,090,637

DISPENSER FOR CONICAL CONTAINER

Donald Farrington Williamson, 16 Shasta Drive, Thornhill, Canada

Filed Aug. 13, 1976, Ser. No. 714,039
Int. Cl.² B65G *59/00*
U.S. Cl. 221—92 **6 Claims**



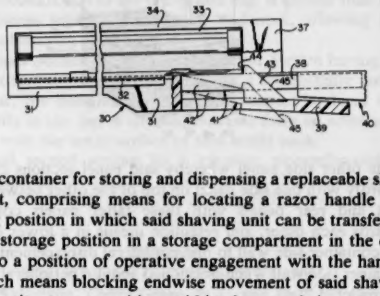
1. A dispenser for conical articles such ice cream cones and the like of the type having a plurality of storage columns for said articles arranged above an open-fronted enclosure with a portion of the lowermost article extending into the open-fronted enclosure from which the articles may be grasped and drawn downwardly and removed from the enclosure, and in which the improvement comprises: at least one row of such columns, each such row being formed of two sheets of synthetic thermoplastic material shaped with parallel semi-cylindrical formations extending therealong, and webs of said material extending between said semi-cylindrical formations, said two sheets being fastened together with said semi-cylindrical formations in registration with one another to form said columns, and said webs extending between adjacent columns and providing mutual support, and article restraining means at the lower end of the columns.

4,090,638

SHAVING UNIT DISPENSER

Harry Pentney, Reading, England, assignor to The Gillette Company, Boston, Mass.

Division of Ser. No. 682,324, May 3, 1976, Pat. No. 4,043,035, This application Oct. 18, 1976, Ser. No. 733,537
Claims priority, application United Kingdom, May 29, 1975, 23499/75
Int. Cl.² A45D *27/24*
U.S. Cl. 221—307 **3 Claims**



1. A container for storing and dispensing a replaceable shaving unit, comprising means for locating a razor handle in a loading position in which said shaving unit can be transferred from a storage position in a storage compartment in the container to a position of operative engagement with the handle, and latch means blocking endwise movement of said shaving unit from its storage position, said latch means being operated to release said shaving unit by abutment with said razor handle in said loading position, said storage compartment comprising a base wall with upstanding guide rail means for receiving said shaving unit, said guide rail means comprising a pair of opposed parallel flanges directed outwardly away from each other, wherein said latch means compreses a contilever spring member extending parallel with said guide rail means and having a hook portion normally partially obstructing said dispensing opening, an end wall to prevent sliding movement of said unit towards that end, and a dispensing opening at the opposite end of said compartment.

4,090,639

MULTIPLE DOSE PASTE DISPENSER

James A. Campbell, West Chester, and R. Richard Unangst, Havertown, both of Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

Filed Feb. 14, 1977, Ser. No. 768,264
Int. Cl.² G01F *11/06*
U.S. Cl. 222—43 **5 Claims**

1. In a multiple dose paste dispenser comprising a piston rod having a piston on the front end thereof, means in said frame for guiding said piston rod, means for securing a cartridge to the frame in alignment with said piston, a gripping ring mounted on said rod, a coil return spring concentric with the piston rod and arranged to engage one side of said ring to urge it in non-tilted orientation in one direction along the rod, means for limiting the movement of said ring in said one direction, and a trigger mounted on the frame for engagement with the opposite side of said ring to advance it in tilted orientation in

the opposite direction to advance the piston in the cartridge, the improvement comprising:

a stepped stop pivoted to the frame on a horizontal axis transverse to the axis of the piston rod for movement to a plurality of positions to provide for a plurality of stop positions limiting the advance of the ring.

4,090,640

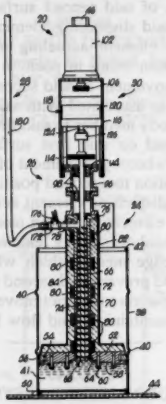
HOT MELT ADHESIVE PUMPING APPARATUS HAVING PRESSURE-SENSITIVE FEEDBACK CONTROL

Ray V. Smith, 7132 Newton Dr., Overland Park, Kans. 66203; Ray F. Smith, 1104 Mic-o-say, Blue Springs, Mo. 64015; Wesley D. Brizendine, 4314 E. 105th Ter., Kansas City, Mo. 64134, and Robert L. Boatman, 9709 Mohawk La., Leawood, Kans. 66206

Continuation-in-part of Ser. No. 598,584, Jul. 24, 1975, abandoned. This application Sep. 22, 1976, Ser. No. 725,540

Int. Cl.[2] B67D *5/62, 5/48*

U.S. Cl. 222—52 **22 Claims**



22. Apparatus for pumping material from a supply thereof comprising:

a pumping assembly including an elongated, tapered barrel having a material inlet and a material outlet, and an elongated, complementally tapered, axially rotatable material-conveying auger situated within said barrel;

supporting and shifting means for supporting said pumping assembly in proximal disposition to said supply of material with said inlet adjacent the latter, and for selective shifting of said pumping assembly toward and into said supply of material such that the latter can be received in said barrel through said inlet;

means operatively coupled to said auger for selectively rotating the latter in a direction for conveying said material from said inlet to said outlet; and

means operatively coupled to said auger for selectively axially shifting the latter from a normal material-conveying position in a direction for increasing the distance between the outer edges of said auger and the inner defining wall surfaces of said barrel.

4,090,641

REFRIGERATOR ICE DOOR MECHANISM

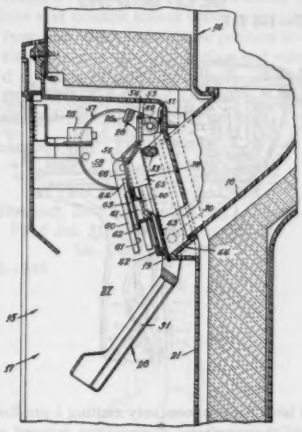
Robert Edward Lindenschmidt, Evansville, Ind., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Aug. 26, 1976, Ser. No. 718,146

Int. Cl.[2] B67D *5/06*

U.S. Cl. 222—70 **12 Claims**

9. In an ice piece dispensing apparatus having means defining an opening, comprising: closure means; delivery means selectively operable to cause sequential delivery of ice pieces through said opening; actuator means for energizing said delivery means and causing said closure to move away from said opening, said closure means being biased so that immediately upon release of said actuator means the closure means tends to block the opening substantially against free air flow therethrough while permitting ice pieces to move the closure means



away from the opening to permit dispensing thereof; force-applying means for urging said closure means sealingly across said opening; and time delay means permitting said force-applying means to urge said closure sealingly across said opening only after a predetermined period of time subsequent to release of said actuator means.

4,090,642

PACKAGE AND DISPENSER FOR FLOWABLE MATERIALS

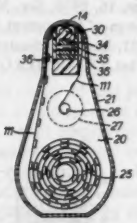
Hugh William Barnes Baker, Beaconsfield, England, assignor to The Gillette Company, Boston, Mass.

Filed Aug. 24, 1976, Ser. No. 717,338

Claims priority, application United Kingdom, Aug. 28, 1975, 35579/75

Int. Cl.[2] B65D *35/22, 35/28, 47/10, 25/08*

U.S. Cl. 222—94 **4 Claims**



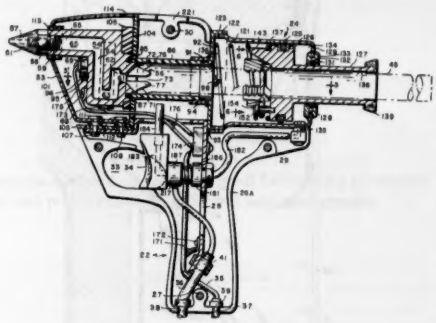
1. A package for dispensing flowable materials in individual doses, said package comprising an elongated flexible tape comprising first and second layers, said tape having along its length a plurality of individual pockets containing the materials to be dispensed, said layers being permanently laminated to each other along the elongated margins of said tape, peelable areas beginning at the edge of said pockets and extending at least a portion of the distance to the adjacent pocket and openings in one of said layers over at least some of the peelable areas, whereby when pressure is applied to said pockets said material will penetrate through said peelable areas and flow out through said openings.

4,090,643

HOT MELT APPLICATOR

Everett R. Wilkinson, Jr., Rockport, and Henry E. Cooper, IV, North Andover, both of Mass., assignors to The Terrell Corporation, Wilmington, Mass.

Filed Sep. 17, 1976, Ser. No. 724,178
Int. Cl.[2] B67D *5/62*
U.S. Cl. 222—146 HE **11 Claims**



6. A melt head for progressively melting a pre-formed cylindrical rod of thermoplastic composition pressed against said melt head, comprising in combination:

a conical element with its apex directed towards the axis of said rod,

a tubular element surrounding said conical element and said rod,

heating means to heat said conical element to a temperature in excess of that at which said thermoplastic composition becomes molten,

an exit port arranged substantially axially of said conical element adjacent the base thereof to permit the removal of molten composition, and

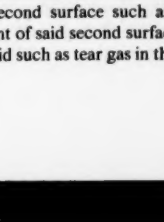
at least one passage from the face of said conical element to said exit port.

4,090,644

FLUID DISPENSING ANTI-BURGLAR BOOBY TRAP DEVICE

Charles R. Fegley, 1606 Frush Valley Rd., Laureldale, Pa. 19605

Filed Apr. 16, 1976, Ser. No. 677,686
The portion of the term of this patent subsequent to Apr. 23, 1991, has been disclaimed.
Int. Cl.[2] B65D *83/14*
U.S. Cl. 222—180 **4 Claims**



1. A fluid dispensing anti-burglary booby trap device for attachment to a first surface such as a wall wherein said device is associated with a second surface such as a window and arranged that movement of said second surface will cause said device to dispense a fluid such as tear gas in the event unauthorized movement of said second surface is attempted, the device comprising:

(a) a body member;

(b) a container of pressurized fluid supported in said body member, said container having a fluid-dispensing element adapted to release fluid under pressure when actuated;

(c) a passageway in said fluid-dispensing element for directing fluid from said container;

(d) means for actuating said fluid-dispensing element, said dispensing element actuating means mounted for movement and associated with said fluid-dispensing element and said second surface, said dispensing element actuating means actuating said fluid-dispensing element when it is moved by said second surface, thereby causing fluid discharge;

(e) means for movably positioning said dispensing element actuating means whereby said dispensing element actuating means may be positioned between an inactuatable position and an actuatable position, said dispensing element actuating means in said inactuatable position permitting movement of said second surface without causing movement of said dispensing element actuating means, said dispensing element actuating means when in said actuatable position being in position to be moved upon unauthorized movement of said second surface;

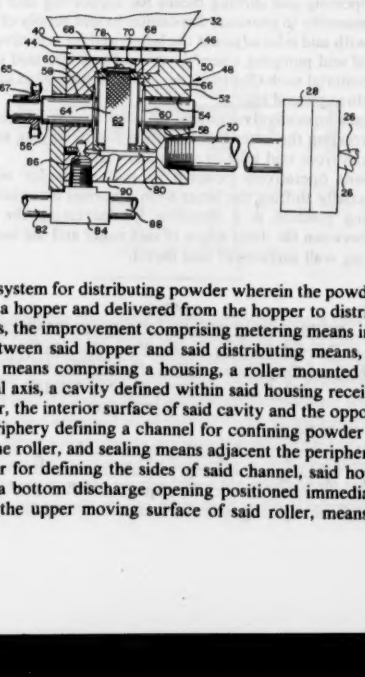
(f) mounting means associated with said body member for fastening said body member to said first surface, said body member arranged on said first surface relative to said second surface whereby movement of said second surface from a first position to a second position will engage with and move said dispensing element actuating means when said dispensing element actuating means is in said actuatable position, said dispensing element actuating means including a wedge means which will wedge lock said second surface to prevent said second surface from returning to its first position to restrict movement of said second surface while maintaining fluid flow from said container.

4,090,645

POWDER METERING SYSTEM

Kenneth D. Mowbray, Des Plaines, and Kenneth L. Hagen, Addison, both of Ill., assignors to Electro Sprayer Systems, Inc., Rosemont, Ill.

Filed Aug. 23, 1976, Ser. No. 716,528
Int. Cl.[2] B67D *5/54*
U.S. Cl. 222—193 **11 Claims**



1. In a system for distributing powder wherein the powder is stored in a hopper and delivered from the hopper to distributing means, the improvement comprising metering means interposed between said hopper and said distributing means, said metering means comprising a housing, a roller mounted on a horizontal axis, a cavity defined within said housing receiving said roller, the interior surface of said cavity and the opposing roller periphery defining a channel for confining powder carried by the roller, and sealing means adjacent the periphery of said roller for defining the sides of said channel, said hopper defining a bottom discharge opening positioned immediately adjacent the upper moving surface of said roller, means for

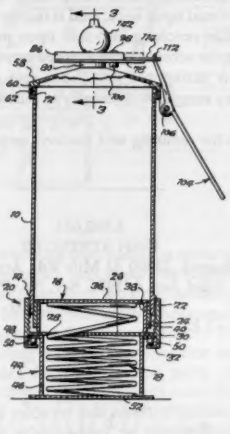
delivering powder from the hopper into contact with the roller, said roller thereby carrying metered amounts of the powder away from the hopper, a passage located in communication with the roller periphery adjacent the bottom moving surface of said roller substantially opposite the position of delivery of the powder from the hopper, said passage extending away from said roller to said distributing means, inlet means for said passage, a source of compressed fluid connected to said inlet means, means for applying said compressed fluid to said roller whereby said powder is picked up from the hopper, said passage extending away from said roller to said distributing means, inlet means for said passage, a source of compressed fluid connected to said inlet means, means for applying said compressed fluid to said roller whereby said powder is picked up from the roller by the fluid and moved with the fluid through said passage to said distributing means, drive means for said roller, and means for varying the speed of said drive means for controlling the rate of movement of said powder into said passage and to said distributing means.

4,090,646

SOFT FOOD DISPENSER

John A. Dubiel, and Bernice R. Dubiel, both of 273 Raymond Ave., Cheektowaga, N.Y. 14227

Filed Sep. 29, 1976, Ser. No. 727,783
Int. Cl.[2] B65D *47/20*
U.S. Cl. 222—326 **8 Claims**



1. A dispenser for fluent material such as soft food comprising:

a. a hollow container for storing the material to be dispensed;

b. piston means connected to one end of said container for pushing the stored material toward the other end of the container and comprising a piston head movable along within said container, biasing means in the form of a coil spring having one end operatively engaging said piston head for urging said piston head toward the opposite end of said container, partition means spaced from said piston head along said coil spring for defining a region for receiving and retaining a portion of said coil spring, said partition having an opening through which said spring extends, and manually-operated spring conditioning means operatively connected to the opposite end of said coil spring for introducing a portion of said coil spring into said region in a manner establishing sufficient stored energy in said spring to move said piston head along within said container a distance sufficient to force all of the material out from said container; and

c. dispensing means connected to the other end of said container for controlling release of the material from said container and comprising conduit means leading from said container for conveying said material and terminating in an outlet, nozzle means in fluid communication with said outlet of said conduit means for discharging the material, and manually-operated valve means operatively between said outlet of said conduit means and said nozzle means and including a valve element movable axially toward and away from said conduit means between an open position spaced from said outlet and a closed position covering said outlet, biasing means normally urging said valve element into said closed position, and manually-operated actuator means operatively connected to said valve element for moving said element to said open position.

4,090,647

APPLICATOR CONTAINER

Belford O. Dunning, 1983 Gordon Rd., #7, Atlanta, Ga. 30310

Filed Jul. 21, 1976, Ser. No. 707,176
Int. Cl.[2] B67D *5/06*
U.S. Cl. 222—543 **1 Claim**

1. A plastic squeeze dispensing container for a chemical hair straightener comprising a body for receiving said hair straightener, a threaded neck at the upper end of said body having an enlarged mouth therethrough, a smooth annular shoulder defined between said neck and said body, a cap having an interiorly threaded cylindrical skirt engageable with the threads of said neck and a lower edge in sealing engagement with said shoulder, a top terminating one end of said skirt, an elongated spout extending outwardly from said top and having a conical outer surface and a central interior recess throughout the length thereof in communication with said mouth, said spout terminated at its outer end by a planar spreading surface angularly disposed at approximately 45° with the longitudinal axis of said spout, the terminal outlet of said interior recess being located at the axial center of said planar spreading surface, wherein it forms an oval dispensing outlet, and a second cap having a closed end, a skirt portion having interior sides in frictional engagement with the conical outer surface of said spout, a tongue which projects into and seals said interior recess, and an inner surface which mates with said planar spreading surface, said planar spreading surface having a surface area substantially greater than the cross-sectional area of said oval dispensing outlet.

4,090,648

DECANTER AND MOLDED INTERLOCKING HANDLE

M. F. Roberts, Niles, Ill., assignor to Bloomfield Industries, a Division of Beatrice Foods Co., Chicago, Ill.

Filed Apr. 9, 1976, Ser. No. 675,473
Int. Cl.[2] B65D *25/42*
U.S. Cl. 222—570 **8 Claims**

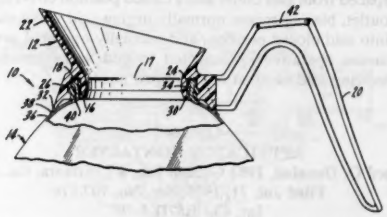
1. A decanter vessel comprising

(a) a rigid receptacle having an integral neck portion formed thereon,

(b) a pouring spout unit having formed therein a continuous

cavity shaped to freely accommodate said neck portion without stress, the width of said cavity being greater than the thickness of said neck portion, forming a gap between said neck portion and the wall of said cavity, and

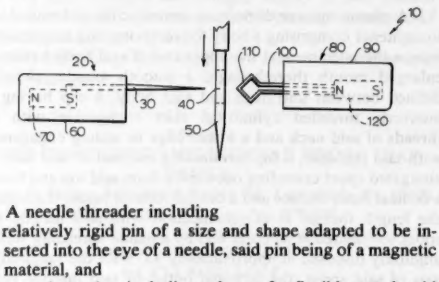
(c) flexible means joining said rigid receptacle and said pouring spout unit, said flexible means



(i) generally surrounding said neck portion within said cavity and substantially filling the remainder of said cavity unoccupied by said neck portion, and

(ii) adhering to said neck portion and said pouring spout unit, forming a mechanical lock therebetween and sealing the gap between the neck portion of the rigid receptacle and pouring spout unit to prevent liquid flow therebetween.

4,090,649
MAGNETIC NEEDLE THREADER
Adele R. Cichinski, 40 Ten Eyck Pl., Edison, N.J. 08817
Filed Jul. 5, 1977, Ser. No. 812,813
Int. Cl.[2] D05B *87/00*
U.S. Cl. 223—99 **4 Claims**



1. A needle threader including

a relatively rigid pin of a size and shape adapted to be inserted into the eye of a needle, said pin being of a magnetic material, and

a second member including a loop of a flexible metal, said loop being of a magnetic material and adapted to be inserted in the eye of said needle due to its attraction to said pin, said loop being adapted to receive a thread when inserted through said eye.

4,090,650
CANTEEN WITH A STRAW
Harold J. Gotta, 44 Cove La., Levittown, N.Y. 11756
Filed Jul. 26, 1976, Ser. No. 709,000
Int. Cl.[2] A45F *3/20, 5/00*
U.S. Cl. 224—5 W **11 Claims**

1. A canteen assembly comprising: canteen means including

a hollow body for holding a drinkable liquid and a threaded open neck operatively connected to said body;

closure means comprising a screw cap for said open neck which is threadably receivable on said neck, said neck having threading for said screw cap, the screw cap being movable between an opening and closing position, said screw cap having an opening therein;

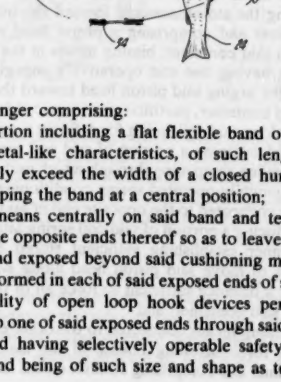
extendable and retractable flexible straw means extending through said opening in said closure means and into said hollow body, and straw means being movable between a withdrawn position in which a substantial portion thereof projects outwardly of said open neck and a retracted position in which said straw means is contained substantially within said body and neck;

straw pinching means disposed on said neck and closure means which cooperate to positively pinch said flexible straw means into a closed condition when said closure means is in a closed position and said straw means is in a retracted position;

said straw pinching means comprising a stationary member as part of said open neck, said stationary member having a top surface reaching into said open neck, and means for stopping the screw cap in a closed position so that its inner surface is juxtaposed proximate said top surface of said stationary member sufficiently to pinch said straw to close it; and

belt means for securing said canteen means to the waist of a user.

4,090,651
FISH STRINGER
Edward M. Raquel, 22500 33 Mile Rd., Armada, Mich. 48005
Filed Jun. 4, 1976, Ser. No. 693,015
Int. Cl.[2] A01K *65/00*
U.S. Cl. 224—7 E **2 Claims**



1. A fish stringer comprising:

a handle portion including a flat flexible band of material having metal-like characteristics, of such length as to substantially exceed the width of a closed human hand when grasping the band at a central position;

cushioning means centrally on said band and terminating short of the opposite ends thereof so as to leave said ends of said band exposed beyond said cushioning means;

an aperture formed in each of said exposed ends of said band;

a first plurality of open loop hook devices permanently attached to one of said exposed ends through said aperture therein and having selectively operable safety pin-type closures and being of such size and shape as to hook at

least a single game fish therein whereby a plurality of said game fish may be strung at said one end;

a second plurality of open loop hook devices permanently attached at the other of said exposed ends through said aperture therein and having selectively operable safety pin-type closures and being of such size and shape as to hook at least a single game fish therein whereby a plurality of said game fish may be strung at said other end;

a chain having a length substantially exceeding the length of said handle and being permanently attached to said one of said exposed ends, the unattached end of said chain having a third open loop-type hook device having a safety pin-type closure whereby the unattached end of said chain may be selectively hooked to said other end of said handle or to various objects for anchoring purposes.

4,090,652

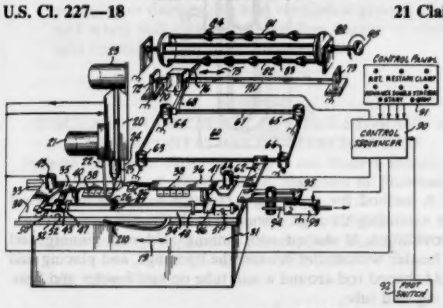
SNAP FASTENER ATTACHING SYSTEM

Herbert M. Silverbush, Cranston, R.I., assignor to Rau Fasteners, a division of U.S. Industries, Inc., Providence, R.I.

Filed Jan. 24, 1977, Ser. No. 761,807

Int. Cl.[2] A41H *37/04*

U.S. Cl. 227—18 **21 Claims**



1. Apparatus for attaching snap fasteners about an elongated edge of a piece of material, said apparatus employing a snap fastener attaching mechanism of the type including means for positioning a front fastener part at an emplacement location, and a second corresponding fastener part spaced from said first part at a corresponding location, for insertion of a garment material between said first and second parts, emplacement means associated with said attaching mechanism for emplacing said first and second parts on said inserted garment when said emplacement means are actuated, in combination therewith apparatus for automatically emplacing a plurality of fastener parts about said edge at predetermined intervals, comprising:

(a) a planar member having a longitudinal slot of a given length on a surface thereof, said member positioned between said first and second part locations of said attaching means with said slot located in communication with said emplacement area.

(b) a first and a second selectively actuated clamping means located on said surface of said planar member and directed along and relatively parallel to said slot,

(c) a right and a left adjustable guide means positioned on said surface of said planar member with said right guide means positioned at the right of said slot and said left guide means positioned on the left of said slot, for enabling the alignment of a right end edge of said material by said right guide and alignment of a left end edge by said left guide,

(d) means for selectively operating a first one of said clamping means upon alignment of an associated end edge of said material and for selectively activating said other clamp for alignment of said other edge after activation of said first one of said clamping means, and

(e) means for providing relative motion between said planar member and said attaching means and operative to emplace said fastener parts about said edge of said clamped garment during said movement at selected predetermined intervals.

4,090,653

APPARATUS FOR ATTACHING TAG PIN

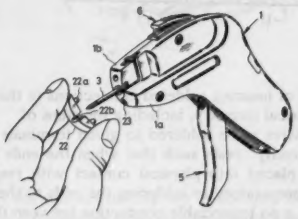
Akira Furutu, Tokyo, Japan, assignor to Japan Bano'k Co., Ltd., Tokyo, Japan

Filed Jun. 24, 1976, Ser. No. 699,572

Claims priority, application Japan, Jun. 24, 1975, 50-87419[U]; Jun. 24, 1975, 50-87420[U]; Jun. 24, 1975, 50-87421[U]; Jun. 24, 1975, 50-87422[U]

Int. Cl.[2] B25C *1/00*

U.S. Cl. 227—67 **2 Claims**



1. Apparatus for attaching a tag pin comprising a pistol-shaped body, a lever supported on said body for rocking movement, a pin driven by means of said lever, a ratchet wheel mounted near a slot for inserting tag pins, a ratchet for preventing the inverse rotation of the ratchet wheel and adaptable for disengagement, and a feeding knob for driving said ratchet wheel wherein an adjusting means is removably attached at the forward portion of the pistol-shaped body to adjust the length of insertion of a grooved needle into an article.

4,090,654

APPARATUS FOR AUTOMATICALLY SOLDERING COMPONENTS TO PRINTED-CIRCUIT BOARDS

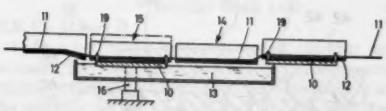
Willi Volkert, Nuremberg, Germany, assignor to Grundig E.M.V. Elektro-Mechanische Versuchsanstalt Max Grundig, Germany

Filed Jul. 1, 1977, Ser. No. 812,269

Claims priority, application Germany, Jul. 6, 1976, 7621287[U]

Int. Cl.[2] B23K *1/08;* H05K *3/34*

U.S. Cl. 228—40 **6 Claims**



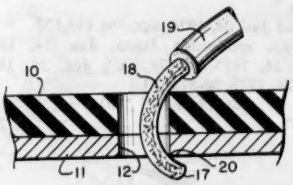
1. An apparatus for soldering components to a printed-circuit board in accordance with the "drag bath soldering" process including in combination a solder bath, transport frames for supporting said printed-circuit board, straps supporting said transport frames on either side of said bath, guide tracks in which said straps are supported for movement of said transport frames over said bath, a lowered section of said guide tracks where the under surface of said printed-circuit board supported by said transport frames being moved through said section will be in contact with said bath, means for moving said straps whereby said transport frames will enter, move through and exit said lowered section, and a lift means for lifting said printed-circuit board perpendicularly from contact with said bath upon exiting said lowered section.

4,090,655

METHOD FOR INSURING SOLDERED CONNECTIONS

Pierre L. Tissot, 863 Via de la Paz, Pacific Palisades, Calif. 90272

Filed Jun. 13, 1977, Ser. No. 805,658
Int. Cl.[2] B23K *21/00*
U.S. Cl. 228—103 3 Claims



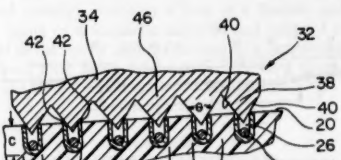
1. A method of insuring soldered connections in the manufacture of electrical circuitry, including the steps of:
(a) coating wires to be soldered to given terminals with a "solder friendly" resin such that when the ends of said wires are placed into physical contact with respective terminals preparatory to soldering the ends to the terminals, there is no appreciable conduction between the ends of said wires and said terminals;
(b) carrying out a soldering operation of the ends of the wires to the terminals;
(c) testing the electrical circuitry for proper conductivity and continuity after completion of said routine soldering operation; and,
(d) soldering any wire ends to their appropriate terminals which were overlooked during said routine soldering operation as indicated by non-conduction during testing of said electrical circuitry.
whereby it is assured that all connections in said circuitry are properly soldered.

4,090,656

SOLDERING IRON AND METHOD FOR SOLDERING A PLURALITY OF WIRES TO A CONNECTOR

Shoichi Sato, and Shizuo Oda, both of Mooka, Japan, assignors to Bunker Ramo Corporation, Oak Brook, Ill.

Continuation of Ser. No. 536,661, Dec. 26, 1974, abandoned.
This application Jan. 17, 1977, Ser. No. 759,913
Claims priority, application Japan, Jan. 25, 1974, 49-10446[U]
Int. Cl.[2] B23K *1/12, 3/02*
U.S. Cl. 228—180 R 11 Claims



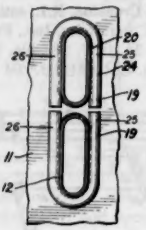
1. An iron for simultaneously soldering a plurality of conductors to spaced metal liners positioned in respective channels of a connector and between barriers of insulation material, said iron comprising:
a plate of heat conducting material;
a plurality of projections on an end face of said plate, said projections being spaced to align with the channels of the connector and including sides that converge toward the outer extremities thereof, each said projection being dimensioned such that the extremity thereof may be positioned within one of said channels with said converging sides in contact with respective edges of the metal liner but spaced from said barriers between said channels; and
means for directing molten solder into said channels and away from said barriers;
whereby heat is conducted by said iron to the metal liners to solder the conductors thereto and the barriers of insulating material are not thermally degraded.

4,090,657

METHOD AND APPARATUS FOR REPAIRING A RADIATOR

Herbert W. Anderson, R.D. #1, Box 211, Jamestown, N.Y. 14701

Filed Mar. 18, 1977, Ser. No. 779,080
Int. Cl.[2] B23K *1/02*
U.S. Cl. 228—119 1 Claim



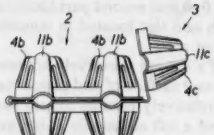
1. A method for repairing a radiator having a header and tubes extending through openings in the header comprising,
providing a U-shaped rod, tinning said rod, tinning said header with solder around the openings, and placing said U-shaped rod around a said tube on said header and heating said tube,
said rod and said header to a temperature sufficient to melt said solder,
and adding sufficient solder to seal said tube to said header and coating said rod, said header and said tube with said solder whereby said solder provides a liquid tight joint.

4,090,658

EGG CONTAINER

Minolu Fukuda, Funabashi, Japan, assignor to Norihiko Takahashi, Hakodate, Japan

Continuation of Ser. No. 567,848, Apr. 14, 1975, abandoned.
This application Sep. 27, 1976, Ser. No. 727,131
Int. Cl.[2] B56D *1/24*
U.S. Cl. 229—2.5 EC 6 Claims



1. An egg container comprising:
(a) a generally rectangular receptacle having two parallel rows of egg-receiving round recesses therein, the bottom portions of each recess in each row communicating with a longitudinal ventilation groove extending from one end of the receptacle to the other end thereof below the egg-receiving portion of said recesses;
(b) a corresponding generally rectangular lid having one

longitudinal side edge flexibly connected along a longitudinal hinging groove to a first longitudinal side edge of said receptacle, said lid having two parallel rows of egg-receiving round recesses therein, the bottom portions of each recess in each row communicating with a single, longitudinal ventilation groove formed within the bottom of said lid and continuously extending from one end of the lid to the other end thereof below the egg-receiving portion of said recesses; and

(c) a securing flap formed of a synthetic resin material and having a longitudinal edge flexibly connected to a second longitudinal side edge of said receptacle along a longitudinal hinging groove, said securing flap having a single row of round recesses adapted to tightly and resiliently engage the outer surfaces of the row of egg-receiving recesses in said lid which is adjacent said securing flap when said lid is in the closed position, said securing flap further including a single, longitudinal flexible groove formed within the bottom of said flap and extending continuously from one end of the securing flap to the other end thereof so as to be in communication with the bottom portions of said recesses in said securing flap for resiliently flexing when engaging or disengaging said ventilation groove of said lid and when said recesses of said flap engage or disengage said corresponding recesses of said lid.

4,090,659

INSULATED CONTAINER FOR THE STORAGE AND TRANSPORTATION OF MERCHANDISE

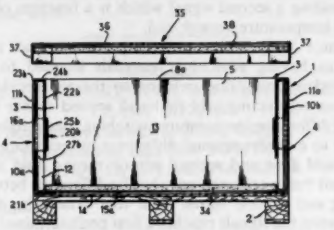
Jacques Galmiche, Sully sur Loire, and Robert Blasco, Saint Jean de Braye, both of France, assignors to Etablissements Larousse, Tigy, France

Filed Sep. 2, 1976, Ser. No. 719,849

Claims priority, application France, Jun. 15, 1976, 76 18102

Int. Cl.[2] B65D *5/22, 5/56*

U.S. Cl. 206—410 **4 Claims**



1. An insulated container for the storage and transportation of merchandise, comprising a base having two opposite edges secured respectively to two panels, each panel having a central portion located between two side flaps, said two panels being foldable toward said base to constitute two opposite side walls of said container, said side flaps being in turn foldable toward said central portions to constitute the two other opposite side walls of said container, each side flap of each panel overlapping a side flap of the other opposite panel in the erect position of the container, insulation plates disposed against the internal faces of the side walls and the base of the container, said container comprising further a lid fitted with an insulating plate for covering the upper edges of said side walls, one of said two side flaps which is to be overlapped by another side flap comprising an open window adapted to receive a strap arranged on said another side flap so that said strap projects inside the container, the straps of the two opposite side flaps being further adapted to receive within each strap an insulation plate applied against the corresponding overlapped side flap having a window in order to lock the two overlapped side flaps in the erect position of the container by means of the last-named said insulation plate.

4,090,660

DISPOSABLE DRINKING CUP LID

Robert A. Schram, 3077 Shore Rd., Bellmore, N.Y. 11710; Alfred Affrunti, Jr., 311 W. Broadway, Port Jefferson, N.Y. 11777, and Angela Affrunti, 1418 Stonybrook Rd., Stonybrook, N.Y. 11790

Filed Dec. 16, 1976, Ser. No. 751,104

Int. Cl.[2] B65D *5/64;* A47G *19/22*

U.S. Cl. 229—43 **3 Claims**

1. A disposable drinking cup lid for snap fitting on an upper edge of a disposable drinking cup, comprising in combination, a circular shaped member formed from sheet plastic, a peripheral groove on an underside of said member, and a pair of radially extending score lines starting at a peripheral edge of said member and extending to a point that is short of a center of said member so that inners ends of said scores lines are spaced apart, said score lines defining a tab therebetween when torn along said score lines and a pair of expandable corrugations formed in said member in parallel relationship with each other, and extending transversely across the entire width of the tab between the score lines in a substantially circumferential direction, whereby when the tab is torn along the score lines the tab can be radially moved by expanding and contacting of the corrugations to facilitate seating of the tab over the upper edge of the cup to close the cup, and wherein the corrugations continue across the score lines onto the adjacent circular shaped member.

4,090,661

DEVICE

Brian Walter Lovegrove, Crawley, England, assignor to Fisons Limited, London, England

Filed Jul. 23, 1976, Ser. No. 708,090

Claims priority, application United Kingdom, Aug. 8, 1975, 33119/75

Int. Cl.[2] B04B *1/00*

U.S. Cl. 233—1 R **6 Claims**

1. In a centrifuge having a walled chamber and a rotor mounted for rotation in said chamber, the improvement of means for increasing the longitudinal circulation of air between the chamber top and chamber bottom and longitudinally along the outer extent of said rotor and the chamber walls,

said improvement comprising:

a lid mounted to the top of said chamber and having a face exposed to the interior of said chamber;

a generally annular depression within said lid face extending around the outer perimeter of said lid, the deepest portion of said lid face depression substantially overlying the outer extent of said rotor;

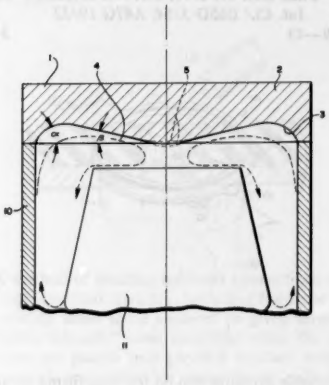
a projecting central portion of said lid face surrounded by said generally annular depression and located substantially centrally over the axis of rotation of said rotor;

said projecting central portion disposed adjacent the rim of said rotor;

an outer wall of said annular depression at the perimeter of said lid being aligned with said chamber wall;

an inner wall of said annular depression being contiguous with said projecting central portion;

said annular depression and said projecting central portion presenting continuous, smoothly merging surfaces within said chamber to assist the longitudinal circulation of air in said chamber; and



said outer wall being inclined at a greater angle with respect to a transverse axis aligned with the top of said chamber than the incline angle between said inner wall and said transverse axis.

4,090,662

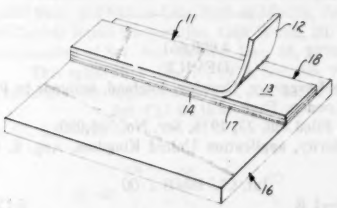
TAMPERPROOF MAGNETICALLY READABLE LABEL

Richard E. Fayling, White Bear Lake, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 28, 1975, Ser. No. 581,543

Int. Cl.[2] G06K *19/00*; G11B *25/04*

U.S. Cl. 235—493 **13 Claims**



1. A flexible magnetic recording medium comprising:

a first layer substantially at the surface of the medium and having more than 0.3 line of flux retentivity per cm of width, a thickness of no more than 60 micrometers and an H_c of at least 3000 oersteds, and permanently bonded to the first layer,

a second layer which will not retain any magnetic signal when subjected to a field sufficient to erase magnetizable media of one-half the H_c of the first layer and which has a thickness of 5–400 micrometers,

a temporary carrier web to which the second layer is removably adhered, and

when the first layer is pre-encoded with digital data and is bonded to a document, the second layer, after removal of the carrier web, protects the first from alteration of its pre-encoded digital data with a conventional head as herein defined.

4,090,663

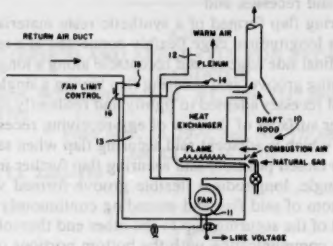
FAN CONTROL FOR FORCED AIR TEMPERATURE CONDITIONING APPARATUS

Ulrich Bonne, Hopkins, and James R. Tobias, Minneapolis, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Feb. 28, 1977, Ser. No. 772,795

Int. Cl.[2] F23N *3/08*

U.S. Cl. 236—10 **6 Claims**



1. A control system adapted for controlling an air circulating fan in a forced-air temperature conditioning apparatus which apparatus has a plenum from which the temperature conditioned circulating air is distributed to the space being temperature conditioned and which has a return air passage from the space to said air circulating fan, the control system comprising:

first thermally responsive sensor means adapted to be mounted in a position so that it will be responsive to the temperature in a plenum of a temperature conditioning apparatus for providing a first signal which is a function of the temperature sensed;

second thermally responsive sensor means adapted to be mounted in a position so that it will be responsive to the temperature in a return air passage of the apparatus for providing a second signal which is a function of the second temperature sensed; and,

difference temperature switching means, said switching means having switching terminals adapted to be connected in controlling relation to the air circulating fan, means connecting said first and second sensor means to said difference temperature switching means to be responsive to a predetermined difference in temperature sensed by said first and second sensor means, said switching means being operated only by the difference between said first and second signal such that when the difference between the signals reaches a first predetermined level the fan is turned on and when the difference drops to a second predetermined level the fan is turned off.

4,090,664

TRI-STATE ELECTRICAL CIRCUIT

Patrick John Elderkin, Wellingborough, England, assignor to Johnson & Starley Limited, England

Filed May 10, 1976, Ser. No. 684,840

Claims priority, application United Kingdom, May 13, 1975, 20199/75

Int. Cl.[2] G05B *11/28*

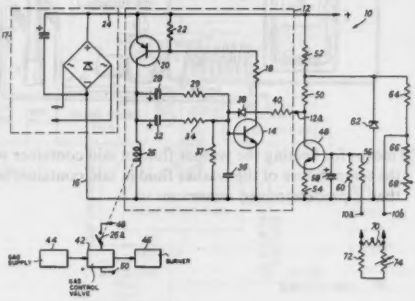
U.S. Cl. 236—11 **33 Claims**

1. An electrical circuit having three states depending upon the magnitude of an input electrical signal coupled, in operation, to an input thereof, the circuit comprising an input for receiving the input signal and an output, and having a first stable state when the said magnitude of said input signal is less than a first, predetermined value, a second, stable state when the said magnitude is greater than a second, predetermined value higher than the first said predetermined value, and a third, unstable state when said magnitude is equal to or between said first and second predetermined values,

said circuit including a semi-conductor device having an input electrode, means for coupling the input signal to said

input electrode such that said device is arranged to conduct current continuously in one of its stable states, to be substantially non-conductive in the other of its stable states and to oscillate between a conductive state and a substantially non-conductive state in its third, unstable state,

said circuit being so arranged that when it is in the third, unstable state the ratio of the time it is in the conductive state to the time it is in the substantially non-conductive



state is dependent upon the magnitude of the input electrical signal,

said circuit comprising two transistors of opposite conductivity type, a feedback network, means coupling the collector of the first transistor to the base of the second transistor and means coupling the collector of the second transistor to the base of the first transistor by way of said feedback network which is arranged to determine the period of oscillation of the circuit when it is in the third, unstable state.

4,090,665

REINFORCED CONCRETE TIE WITH EMBEDDED RAIL CLAMP MEANS

Milton E. Schlesener, Herington, Kans., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Nov. 16, 1976, Ser. No. 742,190
Int. Cl.² E01B *3/32, 9/30*
U.S. Cl. 238—86 **2 Claims**

1. A reinforced concrete tie for use in supporting a track rail comprising a metal reinforcement structure embedded in concrete,

said reinforcement structure in the form of a pair of spaced parallel rectangular shaped rings joined by diagonal braces, with each ring joined to a plurality of hollow sleeves internally embedded in the concrete and each mounted perpendicular to the planes of the rings,

said sleeves formed with means to fasten to bolts,

said sleeves each formed with an axial opening that communicates with an opening in the top surface of the tie so that a bolt fastened in the sleeve may extend above the tie for fastening a track rail to the tie, in which

each sleeve is formed with internal threads for fastening to a first hollow plug and formed with a non-circular internal section of a shape to non-rotatably slidably engage a shaped threaded nut, together with said nut which is fastened in said sleeve between a coil spring mounted between said hollow plug and said nut,

said non-circular internal section located in each sleeve further from the top surface of said tie than the said internal threads so that a bolt inserted from the top surface of the tie extends through said hollow plug, through the interior of said coil spring to engage the threads of the shaped threaded nut, in which

said sleeve is internally fitted with bottoming means to limit the axial travel of the shaped threaded nut in the direction away from the top surface of the tie,

said coil spring serving to apply a pre-stress load to the sleeve and to the concrete tie when the plug is rotated in the engaged threads of the plug and sleeve so as to compress the coil spring against the shaped threaded nut, and compress the shaped threaded nut against the bottoming means of the sleeve, with

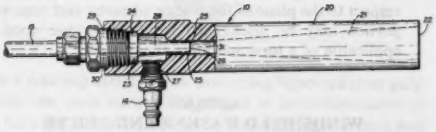
said pre-stress load that is applied to the compressed spring being additive to the compressive load applied to the spring by the tension of a bolt fastened against a track rail resting on a tie and engaged to the internal threads of the said shaped nut.

4,090,666

GUN FOR TRIBO CHARGING POWDER

Richard O. Peck, Lakewood, Colo., assignor to Coors Container Company, Golden, Colo.

Filed May 19, 1976, Ser. No. 688,067
Int. Cl.² B05B *5/02*
U.S. Cl. 239—15 **9 Claims**



1. A gun for tribo charging powder, comprising:

(a) a barrel body having a bore with an opening at one end thereof,

(b) a venturi forming tube mounted in the barrel having a bore in alignment with the bore of said barrel and having an area forming a venturi passage between a portion of the interior wall of said barrel and a portion of the exterior wall of the venturi forming tube, said area opening to the barrel bore substantially in the direction of said barrel opening,

(c) means for delivering propellant gas to the area between said barrel bore and said venturi forming tube,

(d) means for delivering powder to the bore of said venturi forming tube, and

(e) wherein said venturi bore has a hole in its side allowing propellant gas from said area to spirally enter the bore of the venturi forming tube, said hole angling toward the axis

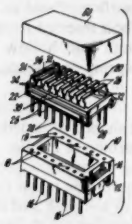
of said venturi bore with forward and lateral angular components; the venturi forming tube further comprising a base end having a groove in its rear side and a ported connection between the groove and the area between the exterior of the venturi forming tube and the interior of the barrel allowing propellant gas into the groove, and wherein said hole passes from the groove to the venturi bore.

4,090,667

UNIVERSALLY PROGRAMMABLE SHORTING PLUG FOR AN INTEGRATED CIRCUIT SOCKET

David J. Crimmins, Stockton, N.J., assignor to Aries Electronics, Inc., Frenchtown, N.J.

Filed May 13, 1977, Ser. No. 796,554
Int. Cl.[2] H01R *31/08*
U.S. Cl. 339—19 **10 Claims**



1. A universally programmable shorting plug for selectively interconnecting contacts of an integrated circuit socket comprising:

a housing having a plurality of spaced, elongated channels extending therethrough; and

a terminal pin assembly including a corresponding plurality of pins disposed respectively in said channels and each having: (1) a terminal post extending from the underside of the housing to provide a connection to a contact of the integrated circuit socket; and (2) an integral portion extending from the opposite side of the housing and interconnected to adjacent pins by strips of electrically conductive bridges, each bridge including a removable portion that is disposed intermediate the length of the bridge, each removable portion defined at its opposite ends by partial score lines extending across the width of the bridge such that the plane of the removable portion is offset with respect to the plane of the bridge whereby said removable portion may be disengaged from the bridge upon the applicaton of a torsional force thereto.

4,090,668

WINDSHIELD WASHER AND DEICER

Paul R. Kochenour, Box 270B, R.D. #2, Halifax, Pa. 17032

Filed Dec. 6, 1976, Ser. No. 747,932
Int. Cl.[2] B60S *1/50, 1/52;* B05B *1/24*
U.S. Cl. 239—130 **11 Claims**

1. A window washing system for a motor vehicle having a battery and a liquid cooling system for the motor in which the cooling liquid becomes warm as a result of heat exchange with the motor, comprising:

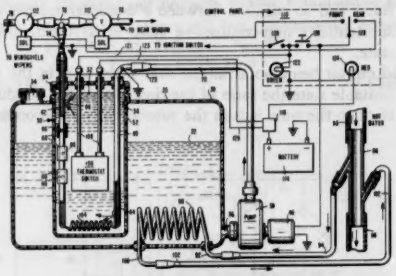
(a) nozzle means located adjacent a vehicle window for directing washer fluid against the window;

(b) a reservoir for containing washer fluid;

(c) a container having an inlet connected to said reservoir and an outlet connected to said nozzle means;

(d) pumping means for transferring washer fluid from said reservoir into said container and from said container to said nozzle means;

(e) means for circulating the warm cooling liquid from the motor cooling system into a heat exchange relationship with the washer fluid inside said reservoir to thereby heat the fluid; and



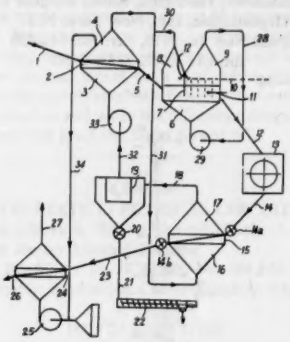
(f) means for heating the washer fluid in said container when the temperature of the washer fluid in said container is less than a predetermined minimum.

4,090,669

PROCESS FOR EMBRITTLING INTEGUMENTS OF SMALL SEEDS

André Lermuzeaux, Sucy-en-Brie, France, assignor to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

Filed May 10, 1977, Ser. No. 795,632
Claims priority, application France, May 28, 1976, 76 16150
Int. Cl.[2] B02C *9/04*
U.S. Cl. 241—8 **8 Claims**

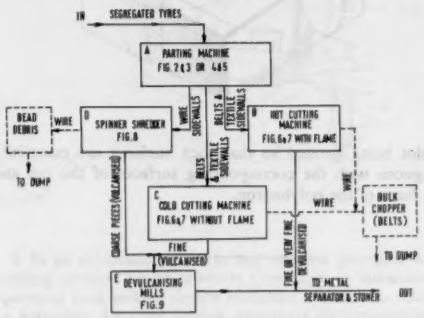


1. A process for embrittling the integuments of small seeds, comprising cooling the seeds by thermal shock in a fluidized bed; said cooling being by direct injection of a cryogenic fluid of liquid nitrogen or liquid carbon dioxide flash evaporated in a fluidized bed and constituting the fluidization gas in the gaseous state; setting in motion the major part of the fluidization gas to circulate in a closed circuit; and recovering cold by countercurrent circulation with the seeds of the other part of the fluidization gas removed from the cooling zone at a temperature close to the seed introduction temperature, to precool said seeds by countercurrent heat exchange.

4,090,670
METHOD AND APPARATUS FOR THE RECOVERY OF VULCANIZED ELASTOMERIC MATERIAL

William Douglas Bennett, Brownhills, England, assignor to Dunlop Limited, London, England

Filed Oct. 15, 1976, Ser. No. 732,862
Claims priority, application United Kingdom, Oct. 8, 1975, 41173/75
Int. Cl.² B02C *21/00*
U.S. Cl. 241—23 18 Claims

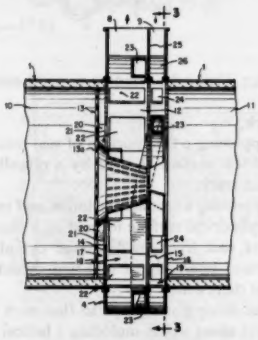

IN SEGREGATED TYRES
A PARTING MACHINE FIG. 2 & 3 OR 4 & 5
BEAD DEBRIS
WIRE
B SPINNER SHREDDER FIG. 8
WIRE
BELTS & SIDEWALLS
BELTS & TEXTILE SIDEWALLS
B HOT CUTTING MACHINE FIG. 6 & 7 WITH FLAME
TO DUMP
BELTS & TEXTILE SIDEWALLS
C COLD CUTTING MACHINE FIG. 6 & 7 WITHOUT FLAME
WIRE
BULK CHOPPER (BELTS)
COARSE PIECES (VULCANISED)
FINE (VULCANISED)
FINE OR VERY FINE (DEVULCANISED)
TO DUMP
E DEVULCANISING MILLS FIG. 9
TO METAL SEPARATOR & STONER
OUT

1. A method for the recovery for re-use of vulcanised elastomeric material from a surface of an article comprising said material, comprising raising the temperature of the surface to a degree and for a period of time to devulcanise only the surface of the article and subsequently removing the devulcanised material from said surface.

4,090,671
TUBE MILL AND METHOD FOR GRINDING CEMENT CLINKER

Helge Carl Christian Kartman, Copenhagen Valby, Denmark, assignor to F. L. Smidth & Co., Cresskill, N.J.

Filed Dec. 28, 1976, Ser. No. 754,963
Claims priority, application United Kingdom, Dec. 29, 1975, 52974/75
Int. Cl.² B02C *17/06*
U.S. Cl. 241—29 24 Claims



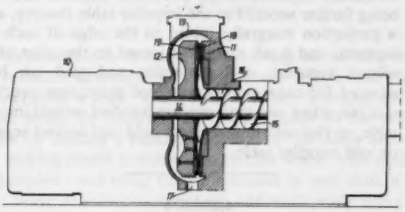
23. A method of grinding coarse material such as cement clinker by means of a multi-compartment tube mill being divided into at least two mill grinding sections including a first mill section having at least one grinding chamber, a second mill section adjacent to the first mill section having at least one grinding chamber, inlet means communicating with said first mill section for introducing coarse material to be ground and at least one of ventilating air or gas to the mill, outlet means communicating with said second mill section for discharging the ground material, a composite diaphragm disposed intermediate said first and second mill sections and defining a separation zone therebetween, at least one conduit for transferring material from said first mill section to said second mill section comprising:

(a) directing coarse material to be ground and at least one of the ventilating gas and air to said first mill section for removing humidity and for cooling to predetermined temperature conditions;
(b) at least partially grinding the material in said first mill section;
(c) directing said ventilating air or gas through said composite diaphragm out of said first mill section;
(d) transferring material from said first mill section to said second mill section through said at least one conduit;
(e) introducing fresh ventilating air or gas through said composite diaphragm into said second mill section so as to control the temperature and humidity conditions in said second mill section; and
(f) directing the ground material and ventilating air or gas from said second mill section.

4,090,672
GRINDING APPARATUS

Bo A. Ahrel, St. Lambert, Canada, assignor to ALF Societe Anonyme, Fribourg, Switzerland

Filed Aug. 11, 1976, Ser. No. 713,433
Claims priority, application Germany, Aug. 12, 1975, 2535979
Int. Cl.² B02C *7/12*
U.S. Cl. 241—261.1 9 Claims



1. In a grinding apparatus for producing ligno-cellulose pulp in which the pulp material is ground in an environment of steam between a rotating disc and a non-rotating disc enclosed within a housing, each of said discs comprising a series of peripherally disposed radially extending segments provided with ridges and intervening grooves forming opposing grinding surfaces and defining therebetween a grinding space of predetermined width which merges with a centrally located feed-in zone from which the pulp material is propelled by centrifugal force created by the rotating disc radially outwards through said grinding space, the improvement comprising:

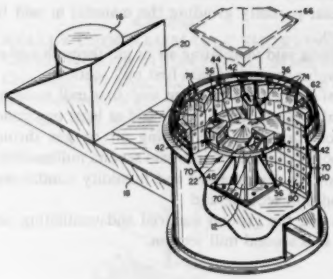
means on the rotating segments effective to cause the centrifugal force to fling the pulp material towards the non-rotating segments to thereby create a passage means adjacent the surface of the rotating segments to allow the steam to escape from said grinding space substantially free of pulp material, said non-rotating segments being effective to retard the radially outward movement of the steam liberated material between the opposing grinding surfaces with resultant improved grinding effect.

4,090,673

CENTRIFUGAL IMPACT ROCK CRUSHERS

Stephen B. Ackers, Portland, Oreg., and Neil M. Rose, Vancouver, Wash., assignors to Canica Crushers Ltd., Vancouver, Wash.

Filed Feb. 18, 1977, Ser. No. 769,908
Int. Cl.[2] B02C *23/00*
U.S. Cl. 241—275 3 Claims



1. In a rock crusher of the centrifugal impact type having an impeller table rotating about a vertical axis for receiving rock on a centerally located feed cone and throwing the rock outwardly against a plurality of anvil surfaces, the rock crusher having at least two wear resistant impeller table liners removably mounted to the upper surface of the impeller table, and having one impeller shoe for each impeller table liner mounted to the impeller table above the impeller table liners for directing the rock radially outwardly, the improvement comprising:

a. each impeller table liner being divided into a first segment and a second segment, and securing means for securing both of said segments to said impeller table, allowing replacement of the first segment without removal of the second segment,

b. said first segment configured for being located under and forwardly adjacent to its associated impeller shoe and being further secured to the impeller table thereby, and

c. a projection integrally joined to the edge of each first segment, and a tab integrally joined to the edge of the second segment, said projection and said tab being adapted for engagement, with said projection overlying said tab, when said segments are installed on said impeller table, so that said first segment hold said second segment on said impeller table.

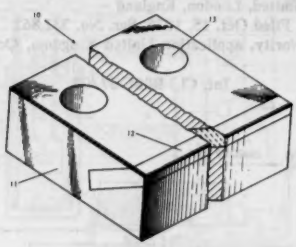
4,090,674

FIXED CUTTING ELEMENT

Larry A. Marshall, and Alexander Hamilton Murdock, both of Arnprior, Canada, assignors to Dow Badische Canada Limited, Ottawa, Canada

Filed Jan. 21, 1977, Ser. No. 761,106
Int. Cl.[2] B02C *18/44*
U.S. Cl. 241—221 2 Claims

1. In an apparatus for comminuting or granulating polymeric and like material comprising the combination of a rotary cutting element and a cooperating fixed cutting element, the improvement therein which comprises a modified fixed cutting element consisting of (a) a rigid polyhedron of quadrangular cross-section and having a top, bottom, front, back, and two side faces; the polyhedron having a substantially rectangular slot partially penetrating therein from the intersection of the top and front faces thereof and extending along the length of the polyhedron from one side face to the other side face thereof; the top face of the polyhedron and a line perpendicular to the longitudinal cross-sectional axis of the slot and passing through the intersection of the top and front faces of the polyhedron forming an angle of between about 20 and 70 degrees; and (b) an insert fabricated from a ceramic material, the insert positioned within the slot and conforming to the configuration thereof, the insert being adhesively bonded to all surfaces of the slot, the surfaces of the insert projecting from



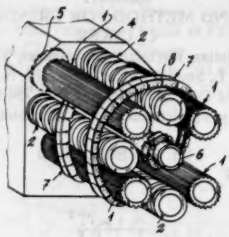
the slot being ground so that such surfaces are essentially contiguous with the corresponding surfaces of the top and front faces of the polyhedron.

4,090,675

ADHERING DEVICE FOR GENERAL ROPE WINDING UP

Walter Betta, Bergamo, Italy, assignor to Wabing S.r.l., Bergamo, Italy

Filed Mar. 25, 1977, Ser. No. 781,320
Claims priority, application Italy, Mar. 26, 1976, 21598 A/76
Int. Cl.[2] B65H *51/20*
U.S. Cl. 242—47 7 Claims



1. An adhering device for winding ropes thereon, comprising:

a looped track;

means for supporting a first portion of said track to define a first cylindrical surface formed by a plurality of helical turns of said track;

means for supporting a second portion of said track to define a second cylindrical surface formed by a plurality of helical turns of said track, said second cylindrical surface being disposed internally of said first cylindrical surface and coaxial therewith;

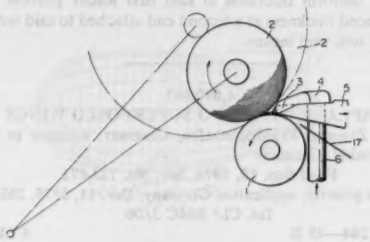
and means for driving said track so that each point on the track, moves along a path including a helical length about said first cylindrical surface and a helical length about said second cylindrical surface internally of said first surface, so that each point on the track, after traversing said helical length on said first cylindrical surface will traverse the helical length on said second cylindrical surface and then re-traverse said first surface and so on, said track being provided with a groove for accomodating the rope winding up on said track along the helical length of said first cylindrical surface.

4,090,676

YARN OR THREAD GUIDING DEVICE

Matsunosuke Yano, Osaka; Toshio Yajima, Toyonaka, and Terukazu Ohta, Ikeda, all of Japan, assignors to Kamitsu Seisakusho, Ltd., Japan

Continuation-in-part of Ser. No. 454,116, Mar. 25, 1974, abandoned. This application Oct. 28, 1975, Ser. No. 625,881
Int. Cl.[2] B65H *54/06, 54/22*
U.S. Cl. 242—18 DD 5 Claims



1. In an automatic yarn winding machine provided with a rotating member which contacts a package, an automatically operating yarn seeking device including a suction nozzle, and an automatic knotting device, apparatus for preventing the throwing off of a loose yarn end of a package, comprising:

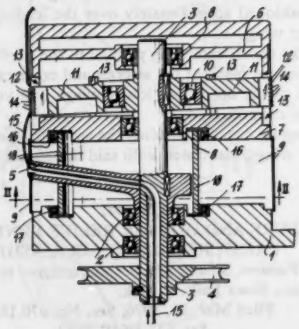
at least one blowing nozzle arranged at the outside of an end face of the package, said nozzle being so arranged as to provide means for continuously blowing out an air current whereby said air current is directed toward the contact point between the package and the rotating member at an approximate right angle to the end face of the package, said blowing nozzle being connected to an air chamber and mounted on said suction nozzle which comprises means to seek and seize the yarn end on the wound package when the automatic knotting operation takes place.

4,090,677

APPARATUS FOR STORING AND FEEDING YARN TO YARN USING MACHINES

Ermanno Savio; Sergio Calamani, and Eugenio Turri, all of Milan, Italy, assignors to Savio e C. S.p.A., Milan, Italy

Filed Mar. 21, 1977, Ser. No. 779,599
Claims priority, application Italy, Dec. 17, 1976, 30543 A/76
Int. Cl.[2] B65H *51/20*
U.S. Cl. 242—47.01 2 Claims



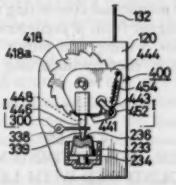
1. An apparatus for storing and feeding yarn to yarn using machines, comprising a base plate securable to a stationary structure, a shaft freely rotatably mounted on at least one rolling bearing carried by said base plate with the ends of said shaft extending from said base plate, a member on one end of said shaft for coupling said shaft to a motor and being rotatably driven thereby, a hollow drum having a cylindrical outside surface carried by the other end of said shaft through at least one rolling bearing having its axis substantially coincident with that of the shaft, a yarn dispensing arm positioned between said base plate and drum and integral with said shaft, and having a channel passing therethrough, said channel extending to and opening in the shaft end externally of the drum and at the adjoining cylindrical end of the drum, respectively, to distribute thereon turns of yarn incoming through said channel, a rocking body for transferring the yarn turns onto the drum, said rocking body being rotatably mounted on said shaft, and means for preventing the drum from rotating on said shaft, said means for preventing the drum from rotating comprising two rolling bearings having a common axis parallel to but offset relative to the axis of said shaft extending through said bearings, of which one has a cage fixed to said base plate, and the other has a cage fixed to the opposing surface of said drum, a rigid connecting body for the movable cages of said bearings being mounted on said two bearings, said connecting body having a passage through which said yarn dispensing arm passes.

4,090,678

SAFETY BELT LOCKING DEVICE

Chusaku Yamanashi, Tokyo, Japan, assignor to Fuji Kiko Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 3, 1976, Ser. No. 720,617
Claims priority, application Japan, Nov. 14, 1975, 50-137046
Int. Cl.[2] A62B *35/02;* B65H *75/48*
U.S. Cl. 242—107.4 A 5 Claims

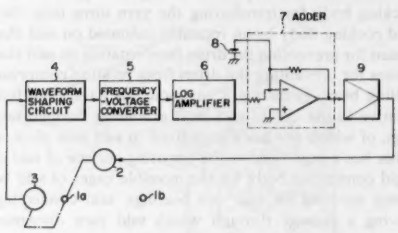


1. In combination in a safety belt locking device for a safety belt retractor adapted to be mounted on a vehicle, said retractor including a frame and a shaft rotatably mounted on said frame; means for detecting a velocity change of the vehicle; means for locking a rapid protraction of the safety belt and; said locking means comprising a ratchet wheel with teeth on the periphery and being fixedly mounted on said shaft, a cam plate being rotatably mounted on said shaft while being disposed adjacent said ratchet wheel, said cam plate having a bifurcated portion defining a space, and a guide member provided on one side of said cam plate, a L-shaped latch having a long leg slidably held by said guide member and a short leg which is engageable with the teeth of said ratchet wheel, a transferring means responsive to a detected change in vehicle velocity by said detecting means for moving said L-shaped latch, and a ratchet pawl with a pair of oppositely outwardly extending arms being rotatably mounted on the frame, one of said arms being placed in said space defined by said bifurcated portion while the other being disposed engageable with the teeth of said ratchet wheel, whereby, when a sudden change of the vehicle velocity occurs, said detecting means being adapted to detect such a sudden change and having means for driving said transferring means causing movement of said L-shaped latch toward said short leg and engagement with the teeth of said ratchet wheel, to thereby rotate said cam plate through said ratchet wheel upon subsequent protraction of said belt causing engagement of the other arm of said ratchet pawl with said ratchet wheel, resulting in the locking of the safety belt.

4,090,679
TAPE TENSION IMPARTING APPARATUS

Kiyoshi Hayashi, Nagoya, Japan, assignor to Shin-Shirasuna Electric Corp., Nagoya, Japan

Filed Feb. 7, 1977, Ser. No. 766,622
Claims priority, application Japan, Feb. 20, 1976, 51-17726
Int. Cl.[2] G11B *15/46, 15/54*
U.S. Cl. 242—186 3 Claims



1. An apparatus for imparting a predetermined tension to a tape transported at a predetermined velocity from one to the other of reels mounted on a pair of reel spindles at least one of which is rotated by a motor to have a rotational torque imparted thereto, said apparatus comprising: means for detecting the number of revolutions of the reel spindle rotated by the motor, means for a frequency-voltage converting a signal resulting from the detection and operatively connected to said detecting means, means operatively connected to said connecting means for converting into a logarithmic signal the signal resulting from said frequency-voltage conversion, means connected to said last mentioned converting means for subtracting said logarithmic signal from a predetermined reference voltage, and means for driving said motor by a signal resulting from the subtraction, thereby imparting a predetermined tension to the tape.

4,090,680
WEB LEADER, WEB WINDING METHODS AND WOUND WEB WITH LEADER

Irving Karsh, Los Angeles, Calif., assignor to Bell & Howell Company, Chicago, Ill.

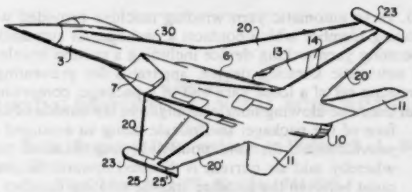
Filed Apr. 7, 1976, Ser. No. 674,539
Int. Cl.[2] G03B *1/04;* G11B *15/32*
U.S. Cl. 242—195 30 Claims

25. An article of manufacture comprising in combination:
web reel means having a pair of spaced circular flange means;
a web wound on said web reel means between said spaced circular flange means;
means for releasably containing said wound web on said web reel means, including a web leader connected to and wound on said wound web on said web reel means, said web leader being stiffer than said web and at least a portion of said web leader having a width sufficient to extend between and engage both of said flange means to be releasably retained between and by said flange means; and
said web leader having a free first end, a first leader portion having a uniform thickness greater than the thickness of said web and extending from said first end to a second leader portion, said second leader portion tapering from said uniform thickness at said first leader portion to a reduced thickness at a second end attached to said web on said web reel means.

4,090,681
AIRPLANE WITH TWO SUPERPOSED WINGS

Herbert Zimmer, Friedrichshafen, Germany, assignor to Dornier GmbH, Germany

Filed Sep. 15, 1976, Ser. No. 723,471
Claims priority, application Germany, Dec. 11, 1975, 2555718
Int. Cl.[2] B64C *3/06*
U.S. Cl. 244—45 R 4 Claims



1. In an airplane having two superposedly-arranged upper and lower sweptback wings which together form a closed frame, with reference to a front view thereof,
the improvement comprising that said upper wing is connected with the airplane fuselage in the form of a high-wing monoplane, and said lower wing is connected in the form of a low-wing monoplane,
said frame having a rhombic shape with said upper wing having a negative V-position and said lower wing having a positive V-position,
both of said wings being rearwardly sweptback, and said upper wing being more markedly sweptback than said lower wing,
said wings being staggered in the direction of the wing depth and air flow such that the trailing edge of the upper wing is positioned approximately over the leading edge of the lower wing,
plate-like means extending parallel to the vertical longitudinal central plane of the aircraft and connecting the outer parts of the upper and lower wings in a vertically staggered manner,
and wing tip means, extending the wing span and common to both wings, associated with said upper and lower wings.

4,090,682
PRESSURE AND HOT AIR RELIEF VENTS FOR A PRESSURIZED HOT AIR AIRSHIP

Roger R. Parsons, Sioux Falls, S. Dak., assignor to Raven Industries, Inc., Sioux Falls, S. Dak.

Filed Mar. 25, 1976, Ser. No. 670,183
Int. Cl.[2] B64B *1/62*
U.S. Cl. 244—99 14 Claims

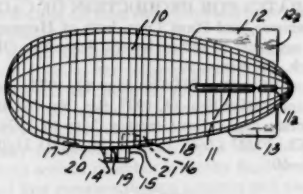
1. A thermal airship comprising in combination:
an elongate gas envelope aerodynamically shaped for horizontal flight;
hot air pressure generating means comprising a fan and burner carried by the envelope which draws and heats air

from a surrounding atmosphere for pressurizing the envelope with heated air during flight, said heated air supplying approximately the entire free lift for the airship;

tail members on the aft end of the airship for controlling the horizontal flight;

a gondola carried below the envelope for supporting a payload;

power propelling means carried by the envelope for propelling the airship horizontally;



and vent means for over-pressure control and ascent and descent maneuvering in the balloon envelope including a port having a movable cover thereon and means for opening and closing the port a controllably variable amount, said vent means being located on the bottom of the envelope so as to permit cooler portions of the pressurizing air adjacent the bottom of the envelope to escape to the surrounding atmosphere.

4,090,683

HARNESS FOR A MAN CARRYING PARACHUTE INCLUDING A MECHANISM FOR SIMULTANEOUS TAKING THE AIR OUT OF THE CANOPY AND UNFASTENING THE HARNESS

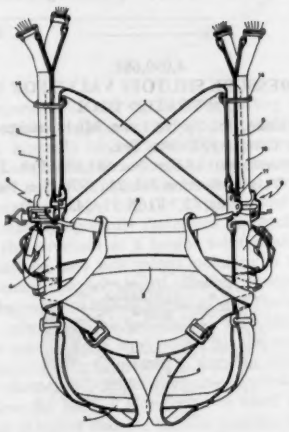
Andre Robert Derrien, Ballainvilliers, and Celestin Cerati, Longjumeau, both of France, assignors to Aerazur Constructions Aeronautiques, Issy les Moulineaux, France

Filed Oct. 22, 1976, Ser. No. 734,971

Claims priority, application France, Nov. 7, 1975, 75 34223; May 31, 1976, 76 16405

Int. Cl.[2] B64D *25/06*

U.S. Cl. 244—151 R **18 Claims**



1. A harness for a man carrying parachute comprising a trapeze webbing, means for attaching risers to said trapeze webbing to shroud-lines of a main canopy, a harness fastening cross-link having two opposite ends and provided for fastening the harness onto a parachutist at the level of his chest, means for connecting said ends of said cross-link to said trapeze webbing, and a means for positioning the attaching point of each said riser onto said trapeze webbing at the level of the corresponding connecting means for connecting said cross-link to said trapeze webbing, wherein at least one of said connecting means for connecting said cross-link to said trapeze webbing is a locking block including a means for ensuring a successive release of the corresponding said riser attaching means and of the corresponding said cross-link connecting means.

4,090,684

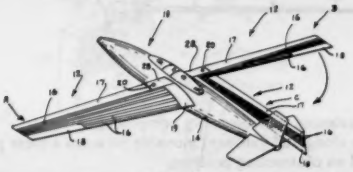
STOWABLE AIRFOIL STRUCTURE

Lance G. Look, Traverse City, and David G. Erickson, Williamsburg, both of Mich., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Continuation of Ser. No. 669,948, Mar. 24, 1976, abandoned. This application Apr. 18, 1977, Ser. No. 788,495

Int. Cl.[2] B64C *3/54, 3/56*

U.S. Cl. 244—218 **1 Claim**



1. In an aircraft structure having a fuselage, a tail section and a pair of airfoil structures, the improvement therein residing in said airfoil structures, each of said airfoil structures capable of movement between a fully deployed position and a stowed position along side said aircraft fuselage and resting adjacent said tail section, each of said airfoil structures comprising a supporting structure extending along the span of said airfoil structure, said supporting structure being made up of at least two components, one of said components being capable of insertion within the other component in the spanwise direction, at least two sets of a plurality of spanwise elements, one of said sets of spanwise elements being operably connected to one of said components and the other of said sets of spanwise elements being operably connected to the other of said components, each of said spanwise elements being of a channel-shaped configuration having a back portion and a pair of arms, said elements being capable of nesting within one another in a retracted position, means for operably connecting each set of said spanwise elements to said supporting components in the chordwise direction, said means for connecting each set of said spanwise elements to said supporting components, respectively, comprising a plurality of hinge assemblies including intermediate hinge assemblies, each of said hinge assemblies being made up of a pair of elements, said hinge assembly elements being pivotally connected together, said intermediate hinge assemblies each having a lug fixedly secured to one of said spanwise elements, each of said lugs having outstanding elements thereon, said outstanding elements on each of said lugs being pivotally connected to one of said pair of elements of each of said hinge assemblies located adjacent thereto, each of said hinge assemblies thereby capable of folding in an accordian-like fashion with the pivotal connection of said pair of hinge assembly elements to each other collapsing in a direction away from the location of said lugs and toward the direction of said fuselage when said airfoil structure is in said retracted position, said back portions of said spanwise elements being in substantial engagement with one another in said retracted position, means operably connected between said supporting structure and each set of said spanwise elements for moving said spanwise elements in the chordwise direction between a deployed position defining an airfoil structure and said retracted position and means operably connected between said

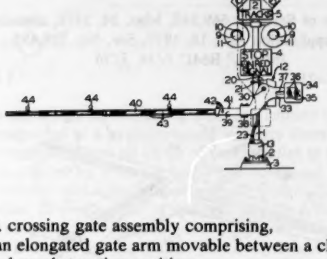
aircraft fuselage and said airfoil structure for pivoting said airfoil structure in the retracted position to a stowed position along side said fuselage and adjacent said tail section.

4,090,685

GRADE CROSSING ASSEMBLY

Spiro J. Pappas, Verona, Pa., assignor to Westinghouse Air Brake Company, Swissvale, Pa.

Filed Feb. 22, 1977, Ser. No. 770,523
Int. Cl.[2] B61L *29/08*
U.S. Cl. 246—125 **14 Claims**



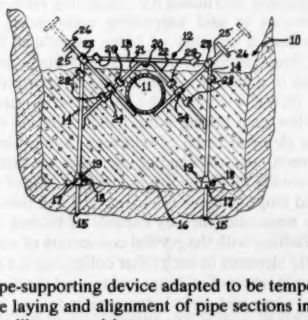
1. A crossing gate assembly comprising,
(a) an elongated gate arm movable between a clear position and an obstructing position,
(b) a gate arm bracket including a breakaway connector for holding said elongated gate arm,
(c) a gate support means coupled with said gate arm bracket,
(d) a gate mechanism cooperatively associated with said gate supporting means, said gate mechanism includes a motor and a gear train for rotating an output shaft wherein said elongated gate arm is moved between said clear and said obstructing position, said motor including shaft extension means for receiving a torque measuring device for determining the torque that is required to lift said gate arm from said obstructing position and for establishing the downward torque when said gate arm is allowed to freely move from said clear position to said obstructing position.

4,090,686

PIPE-LAYING APPARATUS

Ted G. Yarbrough, P.O. Box 138, Matthews, Mo. 63867

Filed Feb. 7, 1977, Ser. No. 767,999
Int. Cl.[2] B63B *35/04*
U.S. Cl. 248—49 **5 Claims**



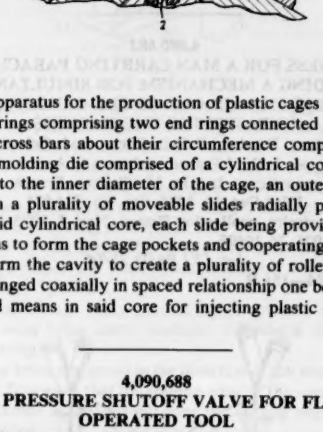
1. A pipe-supporting device adapted to be temporarily used during the laying and alignment of pipe sections in an excavation or the like, comprising
(a) a pipe-supporting frame having a crossbar connected at opposite ends at right angles to a pair of depending posts,
(b) a strengthening bracket within said frame having oppositely disposed struts extending angularly between said crossbar and each of said posts,
(c) a pair of pipe-supporting members carried by said frame and said strengthening bracket and movable through intersecting paths relative to each other and a pipe section supported beneath said frame,
(d) and means on said frame and said strengthening bracket through which said pipe-supporting members are free to move through intersecting paths relative to each other at a point beneath said strengthening bracket.

4,090,687

APPARATUS FOR PRODUCTION OF CAGES

Hans Langhammer, and Hans Loos, both of Herzogenaurach, Germany, assignors to Industriewerk Schaeffler OHG, Herzogenaurach, Germany

Continuation of Ser. No. 576,570, May 12, 1975, abandoned. This application Feb. 14, 1977, Ser. No. 768,485
Claims priority, application Germany, May 10, 1974, 2422669
Int. Cl.[2] F16C *33/46;* B29C *1/14;* B29D *31/00*
U.S. Cl. 249—60 **3 Claims**



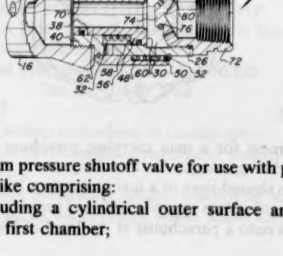
1. An apparatus for the production of plastic cages for radial roller bearings comprising two end rings connected by a plurality of cross bars about their circumference comprising an injection molding die comprised of a cylindrical core corresponding to the inner diameter of the cage, an outer die element with a plurality of moveable slides radially positioned around said cylindrical core, each slide being provided with projections to form the cage pockets and cooperating with the core to form the cavity to create a plurality of roller bearing cages arranged coaxially in spaced relationship one behind the other, and means in said core for injecting plastic into said cavity.

4,090,688

LOW PRESSURE SHUTOFF VALVE FOR FLUID OPERATED TOOL

William Workman, Jr., Spring Lake, Mich., assignor to Gardner-Denver Company, Dallas, Tex.

Continuation-in-part of Ser. No. 661,886, Feb. 27, 1976, abandoned. This application Jul. 21, 1976, Ser. No. 707,476
Int. Cl.[2] F16K *31/143*
U.S. Cl. 251—25 **8 Claims**



6. A minimum pressure shutoff valve for use with pneumatic tools and the like comprising:
a body including a cylindrical outer surface and a bore defining a first chamber;

means defining a second chamber opening into said first chamber;

a piston supported within said body for sliding movement from said first chamber into said second chamber to form a closure between said first and second chambers, said piston including first and second opposed pressure surfaces thereon;

a fluid inlet passage in communication with said first chamber;

a fluid outlet passage;

a valve seat disposed on said body and engageable by said piston to close off fluid flow from said inlet passage to said outlet passage;

passage means opening to said outer surface for venting pressure fluid to the atmosphere exterior of said body from said second chamber; and,

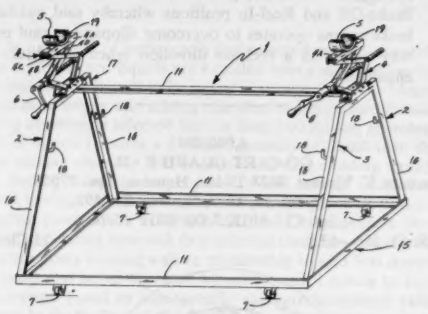
a sleeve disposed on said body around said outer surface and normally blocking said passage means, said sleeve being manually actuatable at will to open said passage means to vent said second chamber whereby fluid pressure acting on said first pressure surface actuates said piston to open said valve.

4,090,689

APPARTUS FOR SUPPORTING AND TRANSPORTING GYMNASTIC EQUIPMENT

Sharon Sue Enzenauer, 9556 Parklane, Ladue, 63124, and Donna Jean Schaeffer, 2020 St. Clair Ave., Brentwood, Mo. 63144

Filed Apr. 19, 1976, Ser. No. 678,025
Int. Cl.² B66F *7/14*
U.S. Cl. 254—7 R **17 Claims**



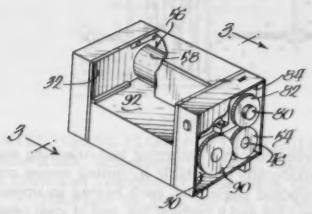
1. An apparatus for storing and transporting thereon in a suspended condition gymnasium equipment such as an uneven parallel bar assembly having a bar-like member near its top, comprising a movable structure and jack means supported thereon, said structure including means for movement on a floor-like surface supporting the structure and spaced end portions extending upwardly therefrom, said jack means positioned on the structure at a height substantially above the floor-like surface, said jack means including at least one upwardly opening channel shaped member positioned thereon for vertical movement into engagement with the bar-like member of the gymnasium equipment and adjustable to lift and support the equipment in an elevated but suspended position, said jack means being adjustable to vary the elevation of the associated channel shaped member between a lowered position spaced below the bar-like member to be lifted and an upper position that is higher than the unlifted position of the bar-like member, said structure and supported jack means being adapted to be moved when said jack means are in a lowered position to a position in which the channel shaped member is located beneath the bar-like member of the gymnasium equipment to be supported and transported so that adjustment of said jack means raises the channel shaped member to a position engaging the bar-like member and thereafter further raises the bar-like member and the gymnasium equipment of which it is a part to a suspended elevated condition above the floor for transport and storage on the structure, said structure being an open framework having frame members connecting said spaced end portions, and wherein the equipment to be supported includes guy means for attaching to a floor to maintain an erect position therefor, said structure including hook means thereon for holding and supporting said guy means when detached from the floor.

4,090,690

STAPLE REMOVING METHOD

Robert M. Nitschneider, Cary; John R. Sargis, and Martin Abrams, both of Chicago, all of Ill., assignors to AES Technology Systems, Inc., Elk Grove Village, Ill.

Filed Jan. 21, 1977, Ser. No. 760,916
Int. Cl.² B25C *11/00*
U.S. Cl. 254—28 **16 Claims**



1. In a plurality of documents bound together by a clinched staple passing therethrough, a method of disengaging the staple from said documents comprising the steps of applying a pressure to opposite sides of said plurality of documents and to the portions of the staple located on said opposite sides of said documents sufficient to cause each of said portions to penetrate into and sever the connected documents, and

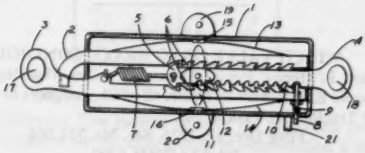
separating the documents from the staple.

4,090,691

AUTOMATIC TURNBUCKLE

Harold J. Bingaman, 6309 Pentz-Magalia Hwy., Paradise, Calif. 95969

Filed Jun. 30, 1977, Ser. No. 811,542
Int. Cl.² B66F *19/00*
U.S. Cl. 254—51 **7 Claims**



1. A tool for automatically removing slack from a line comprising two parallel rods each having a single loop formed at one end and encased in an elongated housing with said loops protruding from opposite end of the housing, the looped rods adjacent in the housing to a third rod curved at the end and loosely attached to one of the protruding rods near the loop by mated fittings to form a U with the other looped rod centered therein, there being a spring means for holding the three rods together within the housing; the centered rod having a half-circle head on the inner end arranged to fit opposing rack teeth machined into the other two rods, the center rod having unmatching rack teeth in one side for locking positions used in conjunction with a spring-loaded trigger and lock pin; and with the center-positioned rod being attached to the other

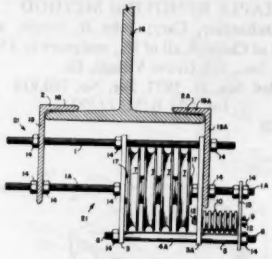
looped rod by a pull spring arranged for one direction automatic movement and being manually adjustable in either direction when the adjacent rods are separated by turning an oblong wheel affixed to an exterior thumbscrew.

4,090,692

CABLE GATHERING AND ORIENTING ASSEMBLY

Lawrence O'Quinn Jacobs, Richmond, Va., assignor to Plastic Products, Inc., Richmond, Va.

Filed Oct. 21, 1976, Ser. No. 734,530
Int. Cl.[2] B66C *23/60*
U.S. Cl. 254—141 **2 Claims**



1. A multi-wheeled cable gathering and orienting assembly comprising horizontally adjustable mounting means comprising a pair of opposed angle bars, each having an upper, horizontally disposed leg and a vertical leg, and at least two parallel horizontally disposed threaded rods which interconnect said angle bars by engagement with the vertical leg of each in at least two different elevations along same, , a plurality of wheels having peripheral grooves and mounted on one of said rods for rotation in vertical planes, the upper extremities of said wheels being below said horizontal legs, first and second straight elongated guard surfaces coextensive with said rods, positioned one above the other in a vertical plane and located closely above and below said wheels respectively, said wheels being each adapted to receive a horizontally disposed moving cable entering said groove under said first guard surface to ride in said groove for essentially 180° of turning angle and emerge underneath said wheel and above said second guard surface, and guide means comprising a multi-grooved roller horizontally displaced from said wheels and mounted above a third guard surface coaxial with said second guard surface, and adapted to facilitate passage of a plurality of cables in a direction vertical to said rods and co-planar and codirectional with said cables emerging from said wheels.

4,090,693

WINCH VALVE DRAG BRAKE CONTROL

Richard F. Hoehn, Pekin; Norman R. Allen, Washington, and Ronald E. Wineburner, Pekin, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

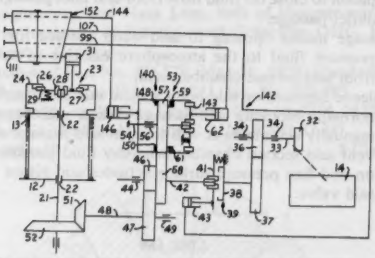
Filed Dec. 17, 1976, Ser. No. 751,564
Int. Cl.[2] B66D *1/00*
U.S. Cl. 254—187.5 **7 Claims**

1. In a winch and fluid control system which comprises (1) a rotatable drum for receiving and releasing a cable, (2) drive-means drive means supporting said drum and for selectively transmitting rotary motion thereto, said drive means including a brake therefor, (3) a source of pressurized fluid, (4) control valve means having inlet means communicating with said source of pressurized fluid and having outlet means, said control valve means having valving element means shiftable between at least three positions including a Brake-On position, a Reel-In position at which said brake is off and said drive means is reeling in said cable, and a Brake-Off position and (5) winch lubricating means communicating said source of pressurized fluid with said winch, an improvement comprising:

a one-way clutch associated in series with said brake allowing said drum to rotate in a reel-in direction when said brake is engaged;

normally biased to be disengaged auxiliary drag brake means in parallel with said brake which engages on application of fluid pressure thereto for stopping rotation of said drum caused by viscous drag of hydraulic lubricating fluid on said drive means when said valving element means is in said Brake-On position; and

fluid flow directing means intermediate said winch lubricating means and said auxiliary brake means which directs a



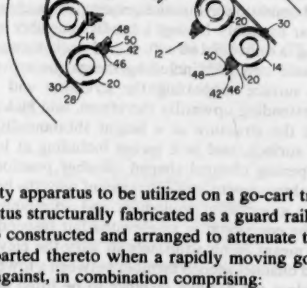
flow of pressurized fluid from said winch lubricating means to engage said auxiliary brake means responsible to shifting of said valving element means to said Brake-On position and directs said flow of pressurized fluid from said winch lubricating means to said auxiliary brake means to disengage said auxiliary drag brake means responsive to shifting of said valving element means to any of said Brake-Off and Reel-In positions whereby said auxiliary brake means operates to overcome slippage in said one-way clutch in a reel-out direction when said brake is engaged.

4,090,694

GO-CART GUARD RAIL

Clarence K. Vincent, 3023 Tilden, Houston, Tex. 77025

Filed Jul. 11, 1977, Ser. No. 814,193
Int. Cl.[2] A01K *3/00*; E01F *15/00*
U.S. Cl. 256—13.1 **11 Claims**



1. A safety apparatus to be utilized on a go-cart track, with said apparatus structurally fabricated as a guard rail assembly which is so constructed and arranged to attenuate the impact energy imparted thereto when a rapidly moving go-cart collides thereagainst, in combination comprising:

at least two vehicle tires disposed in a tread to tread relationship along at least one side and substantially following the geometric configuration of a go-cart track, each tire having a substantially cylindrical outer wall defined by the tread portion thereof, with a pair of opposed, spaced apart, substantially convex side-walls connected to opposite sides of the tread portion, with each side-wall extend-

ing between said tread portion and a substantially circular bead portion of the tire;

a substantially continuous, flexible, ribbon-like guard rail means having a portion disposed in a side by side relationship with a segment of the outer tread surface of each tire, said guard rail means including means for securing the ribbon-like guard rail to each tire, with said flexible guard rail extending substantially uninterruptedly from one tire to an adjacent tire; and

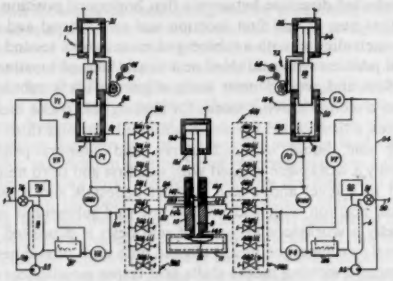
each tire being fixedly secured to a stationary anchor means.

4,090,695

LIQUID FEEDING CONTROL METHOD

Kirby Lee Stone, and Donald James Borisch, both of Cincinnati, Ohio, assignors to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Dec. 16, 1976, Ser. No. 751,107
Int. Cl.² B01F *15/00*; B67D *5/08*
U.S. Cl. 366—76 **6 Claims**



1. In a method of feeding to a first-selected mixing chamber, from which mixed liquids are expelled into a molding cavity, first and second liquids to be mixed in substantially a predetermined ratio within said mixing chamber, in which method said mixing chamber is selected from at least two mixing chambers each of which requires a different quantity of liquid than the other mixing chamber and is connected to a molding cavity, said feeding being via respective first and second liquid feed sytems having respective first and second reciprocable plunger metering pumps each of which feeds into its respective flow restriction leading into such first-selected chamber, said second metering pump bearing a slave relationship to said first metering pump and being operated by ratio control means to feed said second liquid in substantially said predetermined ratio relative to the feeding of said first liquid --- the improvement of resetting and operating the plunger on each pump comprising the steps of

providing at least two of said mixing chambers each associated with a respective molding cavity and each such chamber being selectively connectable to said first and second feed systems so that both liquids can be fed at the same time into the selected one of said mixing chambers;

retracting both said first and second plungers each to substantially the same starting position each time that the system is reset;

filling at least that portion of each liquid system between and including its respective pump and its said flow restriction with its respective liquid;

prior to the next said prepressurizing step selecting one of said mixing chambers into which said feeding is to be conducted, including selecting for the plunger of said first (master) metering pump a predetermined stroke different from the stroke for the other of said at least two mixing chambers for injecting the liquid quantity required by the first selected mixing chamber;

prepressurizing both said first and second liquid systems to respective preselected first and second pressures by advancing the plunger of each pump while preventing any substantial flow into or out of such system;

in response to each of said first and second liquid systems having reached its respective said preselected pressure, injecting and mixing by advancing each said plunger through its respective stroke by moving the plunger of said first metering pump through its predetermined stroke while maintaining said ratio and moving said second plunger through a stroke responsive to said first plunger and while feeding both said liquids through their respective flow restrictions into said mixing chamber;

stopping the moving of said plungers and the flow of both said liquids into said mixing chamber; and

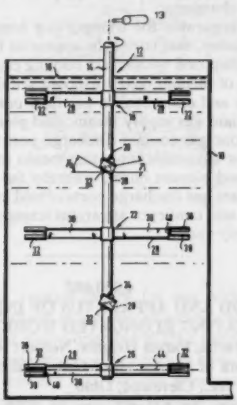
retracting each said plunger to its said starting position, selecting the other of said two mixing chambers and repeating the remainder of the aforesaid steps mutatis mutandis for feeding in said ratio to the newly selected mixing chamber.

4,090,696

INTERFERING FLOW PATTERN AGITATOR

Klausdieter Kipke, Schopfheim, Germany, assignor to Ekato-Werk Erich Karl Todtenhaupt, Schopfheim, Germany

Filed Dec. 15, 1976, Ser. No. 750,803
Claims priority, application Germany, Dec. 22, 1975, 2557979
Int. Cl.² B01F *7/16*
U.S. Cl. 366—327 **18 Claims**



1. An interfering flow pattern agitator for dispersing media in liquids within a vessel, comprising in combination a shaft mounted for rotation within the vessel about an upright axis; at least one rectilinear stirring arm projecting from said shaft transversely of said axis and having an inner end fixed to said shaft and an outer end remote from said inner end; and a pair of interference-flow producing component sub-blades mounted on said outer end of said arm, said inner end forming an inner blade inclined along an acute angle from a plane perpendicular to said shaft, said sub-blades being inclined along an acute angle from a plane perpendicular to said shaft and inverse to the inclination of said inner blade, said sub-blades being so spaced from one another that the flow patterns produced by the respective sub-blades interfere with one another with a resulting reduction in flow resistance, whereby opposing flow patterns cause an interfering fluid motion in the form of cascading currents.

4,090,697

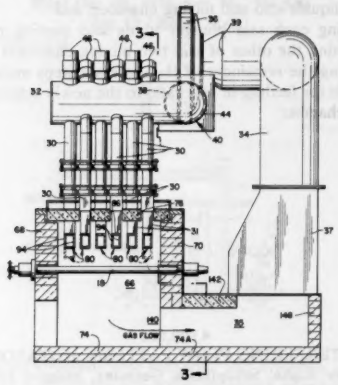
APPARATUS AND METHOD FOR TREATING WIRE

Ralph J. Perrine, Salem, Ohio, assignor to The Electric Furnace Company, Salem, Ohio

Continuation of Ser. No. 467,254, May 6, 1974, abandoned, which is a continuation-in-part of Ser. No. 166,826, Jul. 28, 1971, abandoned. This application Dec. 15, 1975, Ser. No. 640,419

Int. Cl.[2] C21D *9/56*

U.S. Cl. 266—111 19 Claims



1. Apparatus for gas cooling of heated wire comprises:

a jet cooling chamber,

coolant gas supply means to supply a coolant gas to said jet cooling chamber,

conveyor apparatus for transporting heated wire through said chamber, said conveyor apparatus having a transport surface disposed within said cooling chamber,

a plurality of plenum boxes disposed within said jet cooling chamber and connected in gas flow communication with said coolant gas supply means, said plenum boxes having at least one gas coolant discharge port therein,

plenum box adjustable mounting means attached to at least one of said plenum boxes, whereby the distance between the coolant gas discharge ports of said at least one plenum box and said conveyor apparatus transport surface may be selectively varied.

4,090,698

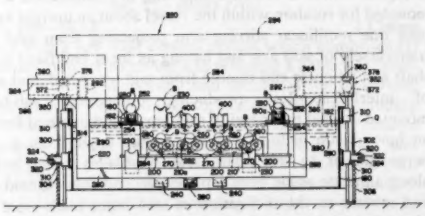
METHOD AND APPARATUS OF INDUCTIVELY HEATING ELONGATED WORKPIECES

George M. Mucha, Parma Heights; Norbert R. Balzer, and Paul L. Day, both of Parma, all of Ohio, assignors to Park-Ohio Industries, Inc., Cleveland, Ohio

Division of Ser. No. 677,981, Apr. 19, 1976, abandoned. This application Jun. 2, 1977, Ser. No. 802,887

Int. Cl.[2] C21D *1/62, 9/08*

U.S. Cl. 266—133 3 Claims



1. An apparatus for quench hardening an inductively heated, elongated, generally cylindrical workpiece having a central axis in a quench tank filled with a quenching liquid to a given level, said apparatus comprising: a frame member in said tank and having first, second and third workpiece receiving nests, each of said nests having means for supporting one of said workpieces with its central axis extending in a selected direction and said first and third nests being vertically above said second nest; first conveyor means for feeding a workpiece in said selected direction toward said tank and to a first support pedestal at a first location in said tank, said first support pedestal including means for supporting a workpiece above said liquid level; second conveyor means for discharging a workpiece in said selected direction away from said tank and from a second support pedestal at a second location in said tank, said second support pedestal including means for supporting a workpiece above said liquid level; at least first and second submerged means in said tank and spaced between said first and second support pedestals for supporting one of said workpieces with its axis extending in said selected direction; first moving means for shifting said frame member transversely of said selected direction between a first horizontal position with said first nest at said first location and said second and third nests each aligned with a submerged means and a second horizontal position with said third nest at said second location and said first and second nests each aligned with a submerged means; a second moving means for shifting said frame member between a first vertical position with said first and third nests above said liquid leveland above said support pedestals whereby a workpiece aligned with said first and third nests are raised to a level above said support pedestals and a second vertical position with said nests below said submerged means whereby a workpiece on each of said nests is deposited on a pedestal or submerged means aligned with each of said nests as said second moving means shifts said frame member between said first and second vertical positions; and means for causing said first moving means to move from said first horizontal position to said second horizontal position when said frame member is in said first vertical position and means for causing said first moving means to shift from said second horizontal position to said first horizontal position when said frame member is in said second vertical position.

4,090,699

APPARATUS AND METHOD OF CIRCULATING A GAS THROUGH COILS OF VERY LONG TUBING DURING A HEAT TREATMENT

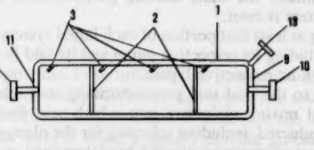
Raymond Michel, Paris, and Donald Whitwham, Marly-le-Roi, both of France, assignors to Trefimetaux, Paris, France

Filed Mar. 29, 1977, Ser. No. 782,329

Claims priority, application France, Apr. 20, 1976, 76 12347

Int. Cl.[2] C21D *9/08*

U.S. Cl. 266—252 6 Claims



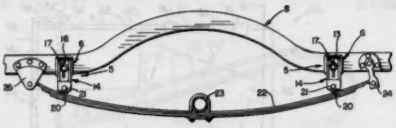
1. Apparatus for circulating a clearing gas through long coils of tubing during a continuous heat treatment in a continuous furnace, comprising a plurality of hollow generally rectangular metal frames, a plurality of nozzles on each frame adapted to receive one end of each of the coil being treated, means for admitting and discharging the clearing gas from said frames, and means for interconnecting the frames longitudinally to each other.

4,090,700

SPRING ASSISTER

Robert E. Davis, 5437 Davis Trail, Yucca Valley, Calif. 92284

Filed Jul. 26, 1977, Ser. No. 819,175
Int. Cl.[2] F16F 1/22
U.S. Cl. 267—45 2 Claims



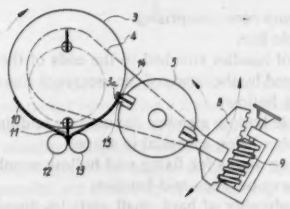
1. In combination with a rear leaf spring of a motor vehicle having an intermediate portion secured to a rear axle and end portions connected to parts of the vehicle frame by spring shackles; spring assisters connected to and depending from the vehicle frame and bearing on the leaf spring between and adjacent the shackles, each spring assister comprising a bracket secured to a part of the vehicle frame and having an upright leg disposed on the outer side of the frame, a support member, means securing said support member to an outer side of said upright bracket leg, said support member being disposed upright in an operative position thereof and having a bottom portion bearing on the leaf spring for assisting the spring in supporting the rear end of the vehicle and the load carried thereby, said bottom portion being recessed to define a downwardly opening fork, a roller carried by the fork, said roller constituting the part of the bottom portion bearing on the spring, and said means clamping the support member in different vertically adjusted positions on the bracket and functioning to secure the support member in an inoperative position crosswise of the upright leg of the bracket and out of engagement with the spring.

4,090,701

CUTTING DEVICE FOR A FOLDING APPARATUS OF A ROTARY PRINTING MACHINE

Eduard Von Hein, Bern, Switzerland, assignor to Maschinenfabrik Wifag, Bern, Switzerland

Filed Oct. 6, 1976, Ser. No. 730,237
Claims priority, application Sweden, Oct. 27, 1975, 7511998
Int. Cl.[2] B41F 13/56
U.S. Cl. 270—21 13 Claims



1. A cutting device for a folding apparatus of a rotary printing machine, or the like, comprising:

a folding cylinder which is rotatable about a first axis and which has a periphery which engages a product to be folded for delivering product to be folded to folding means;

folding means next to said folding cylinder for having product to be folded delivered to it from said folding cylinder and for folding the product; said folding means comprising two adjacent rollers near to, but spaced away from, the periphery of said folding cylinder and means on said folding cylinder for urging a product to be folded between said folding means rollers;

a second cylinder next to said folding cylinder and which is rotatable about a second axis; said second cylinder being spaced from said folding means; said second cylinder including a pressing element attached thereto and rotatable therewith to rotate past said folding cylinder; said pressing element being shaped and positioned so as to press a product to be folded against said folding cylinder as said pressing element rotates past said folding cylinder periphery;

cutting means next to said folding cylinder and being movable periodically into engagement with a product to be folded that is then on said folding cylinder periphery for cutting the product;

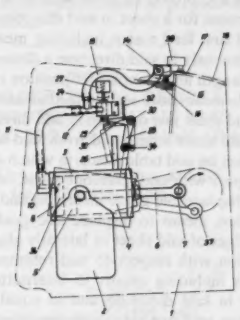
adjusting means for adjusting the position of said second cylinder around said first axis and with respect to said folding means, thereby to shift the angular location around said folding cylinder at which said pressing element engages said folding cylinder.

4,090,702

SUCTION AIR CONTROL DEVICE FOR USE WITH SHEET FEEDS

Arno Wirz, Bammental, Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Germany

Continuation of Ser. No. 535,691, Dec. 23, 1974, abandoned, which is a continuation of Ser. No. 352,192, Apr. 18, 1973, abandoned. This application Jun. 14, 1976, Ser. No. 695,439
Claims priority, application Germany, Apr. 26, 1972, 2220469
Int. Cl.[2] B65H 3/08
U.S. Cl. 271—108 2 Claims



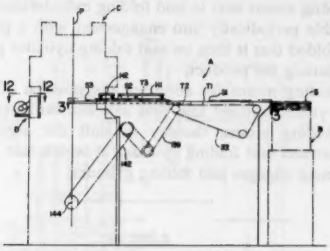
1. A suction air control device for use with sheet feeds feeding individual sheets in a paper processing machine comprising a suction bar means operable to lift a sheet and feed the latter, a vacuum generator means, conduit means including a three-way valve between said vacuum generator means and said suction bar means, said conduit means having a conduit section extending between said vacuum generator means and said suction bar means, said three-way valve having a first passage in communication with said conduit section, said three-way valve having a second passage and a third passage, said first, second and third passages of said three-way valve being in communication with one another, at all times, a first valve operator means connecting said second passage to atmosphere upon command, and a third valve operator means connecting said third passage to atmosphere in synchronism with the operation of said machine, said machine having a housing, said vacuum gnerator means comprising a piston operable in a cylinder, means pivotally mounting said cylinder on said housing, means reciprocating said piston within said cylinder whereby reciprocation of said piston in said cylinder causes said cylinder to oscillate, said cylinder oscillating in synchronism with the operation of said machine and means connected to said cylinder for controlling the operation of said third valve operator.

4,090,703

FEEDING APPARATUS FOR SHEET MATERIAL

Peter Jon Straube, Hastings, Mich., assignor to Gulf & Western Manufacturing Company, Southfield, Mich.

Filed Feb. 7, 1977, Ser. No. 765,980
Int. Cl.[2] B65H *5/16, 9/10*
U.S. Cl. 271—233 **12 Claims**



1. Sheet transfer apparatus comprising table means providing support surface means for a sheet to be transferred to a work station having a reference point, said table means having first and second ends, the direction of transfer being longitudinally of said table means from said first end toward said second end, said sheet having laterally spaced apart side edges and leading and trailing edges providing a length in said direction of transfer, first, second and third feed means supported by said table means and providing three sequential intermittent stages of advancement for a sheet in said direction along said surface means, said first feed means including means to advance said sheet continuously in said direction a distance at least equal to said sheet length and from a first position to a second position on said table means, said second feed means including means to advance said sheet just one step in said direction and a distance less than said sheet length and from said second position to a third position on said table means in which said sheet is longitudinally aligned with said reference point, laterally spaced apart relatively displaceable guide means on said table means at said third position, means to displace said guide means to engage said side edges of said sheet to laterally align said sheet in said third position with respect to said reference point, said third feed means including means to intermittently advance said sheet only in said direction and in equal steps each of less distance than said one step, said third feed means advancing said sheet relative to said reference point and from said third position to a fourth position in which said trailing edge is adjacent said reference point, and means to drive said feed means.

4,090,704

REGISTRATION STATION

Richard E. Smith, Webster; Thomas J. Hamlin, Macedon; Klaus K. Stange, Pittsford, and James R. Cassano, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

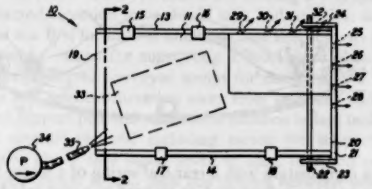
Division of Ser. No. 627,570, Oct. 31, 1975. This application Apr. 11, 1977, Ser. No. 786,321
Int. Cl.[2] B65H *9/06*
U.S. Cl. 271—246 **3 Claims**

1. Apparatus for registering a sheet with respect to perpendicularly related axes, the sheet having a length and width within predetermined ranges, comprising:

(a) a sleeve for internally accommodating said sheet, at least one point on an inner narrow wall of the sleeve being coincident with one of the axes;

(b) a retractable gate located at one end of the sleeve, the gate including a rotatable rod, a manifold coupled to the rod and having at least one rib and a chamber, and means for rotating the rod to bring said at least one rib into or out of the way of travel of a sheet in the sleeve, in one position at least one point on said at least one rib being coincident with the other of the axes;

(c) means for providing in the sleeve a fluid stream having velocity components normal to each of the axes, including a vacuum pump coupled to the chamber; and



(d) means for moving a registered sheet out of the sleeve at a predetermined rate, including a drive roll, a driven roll, and drive means for the drive roll, said driven roll being mounted on a rod and said drive roll being responsive to movement of said at least one rib out of said way of travel.

4,090,705

JUMP ROPE

Ross Young, 5404 S. Bishop, Chicago, Ill. 60609

Filed Mar. 21, 1977, Ser. No. 779,867
Int. Cl.[2] A63B *5/20*
U.S. Cl. 272—75 **5 Claims**

1. A jump rope comprising:

a flexible line;

a pair of handles attached to the ends of the line for being grasped by the hands of the user, each one of said handles being hollow;

a flexible hollow member disposed on said line, said flexible member being spherical in shape;

attaching means for fixing said hollow member to said line midway between said handles;

a first plurality of hard small particles disposed within the hollow handles for rattling therewithin;

a second plurality of hard small particles disposed within said flexible hollow member for rattling therewithin;

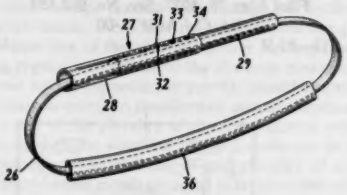
a second hollow member fixed to said line at one side of the first-mentioned hollow member, a third plurality of hard small particles being disposed within the second hollow member to produce a rattling sound during use of the jump rope; and

a third hollow member fixed to the line at the other side of the first-mentioned hollow member, said second and third hollow members being spaced by equal distances from the first-mentioned hollow member, a third plurality of hard small particles disposed within the third hollow member for rattling therewithin.

4,090,706
BELT TENSION EXERCISER

Ronald J. Reda, Mt. Kisco, N.Y., assignor to Reda Exercisers, Inc., Mt. Kisco, N.Y.

Filed Oct. 26, 1976, Ser. No. 735,507
Int. Cl.[2] A63B *21/02*
U.S. Cl. 272—137 2 Claims

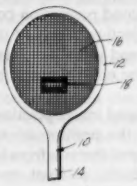


1. An exerciser operable as a closed loop formed by a longitudinally expandable elastic band which engages a rigid handle member, the improvement comprising means for adjusting the length of band between the ends of the handle to effect a change in the force required to expand the band radially outwardly during a selected exercise, the handle being rotatable on its axis relative to the band and comprising a pair of separable concentric hollow cylinders slidably engageable one within the other for longitudinal movement back and forth in one direction to effect a change in the length of the handle.

4,090,707
TENNIS RACQUET SOUNDING DEVICE

Raymond K. Saar, 860 Glendenning, San Bernardino, Calif. 92404

Filed Apr. 29, 1976, Ser. No. 681,440
Int. Cl.[2] A63B *69/38*
U.S. Cl. 273—29 A 7 Claims



1. A tennis teaching device attachable to the strings at the center of a tennis racket comprising a frame member having a flat surface, means resiliently supporting a thin flat diaphragm on the frame member at spaced apart margins of said diaphragm, said diaphragm being further supported by said support means in parallel and spaced apart relationship to said flat surface of the frame member, whereby the center portion of the diaphragm is free to vibrate relative to said surface and emitting an audible sound when struck by a tennis ball, and means securing the frame member and diaphragm to the strings of a racket.

4,090,708
APPARATUS FOR MARKING FOOTBALL FIELDS

Walter G. McPeak, 221½ S. Blvd., Tallahassee, Fla. 32301

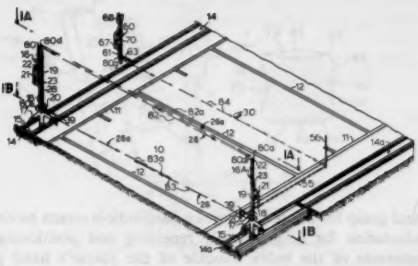
Filed Oct. 26, 1976, Ser. No. 735,847
Int. Cl.[2] A63B *67/00*
U.S. Cl. 273—55 R 9 Claims

1. Apparatus for providing luminous first down lines of demarcation transversely of a rectangular football field, comprising:

a support (18) movable longitudinally adjacent one of the field sidelines (11, 11);

means (20) for releasably anchoring said support in selected positions along said sideline;

means (19, 80) carried by the support for directing a luminous segment (82) of a laser beam (26) across the field and in a vertical plane perpendicular to said sideline, and



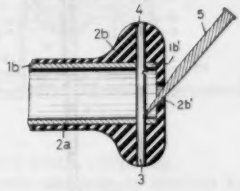
means (80d', 80e') disposed adjacent the opposite sideline of the field and movable longitudinally adjacent thereof for reflecting a second luminous segment (83) of said beam (26) reversely across said field and in said plane,

one of said segments (82, 83) extending horizontally and adjacently above the field surface to provide a ground line of demarcation, and the other of said segments being disposed horizontally thereabove to provide an overhead line of demarcation.

4,090,709
STRUCTURE FOR PREVENTING REMOVAL OF GRIP COVERS FROM METALLIC BATS

Hirokazu Fujii, No. 19-9,2-chome, Obiraki, Fukushima-ku, Osaka, Japan

Filed Oct. 6, 1975, Ser. No. 620,215
Int. Cl.[2] A63B *59/06*
U.S. Cl. 273—72 A 2 Claims



1. In a hollow tubular metallic bat having a grip cover made of hard rubber or the like covering the grip of the bat, said grip cover having an enlarged grip end, the improvement whereby the grip of the bat is prevented from flying out of the grip cover upon swinging of the bat, comprising:

at least one pin or cotter penetrating through said grip end of said grip cover and said grip and wherein said pin or cotter is calked to the inside wall of said grip.

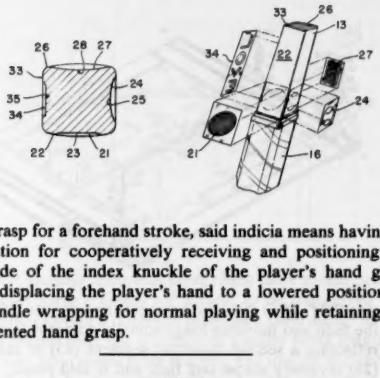
4,090,710
TRAINING TENNIS RACKET

Roy G. Williams, 4905 Hermitage Dr., Raleigh, N.C. 27612

Filed Jan. 28, 1976, Ser. No. 653,157
The portion of the term of this patent subsequent to Jan. 4, 1991, has been disclaimed.
Int. Cl.[2] A63B *49/08*
U.S. Cl. 273—75 5 Claims

1. A tennis playing and training racket comprising a frame with strings having forward and rear faces, a handle extending

from said frame and having a neck intermediate said handle and frame, said handle having a plurality of sides, one of said sides being substantially coplanar with said rear face, a handle wrapping on the lower portion of said handle, indicia means on said one side positioned above and in spaced relation to the handle wrapping for positioning and orienting the player's



hand grasp for a forehand stroke, said indicia means having an indentation for cooperatively receiving and positioning the underside of the index knuckle of the player's hand grasp before displacing the player's hand to a lowered position on said handle wrapping for normal playing while retaining the pre-oriented hand grasp.

4,090,711

GOLF CLUB SHAFTS INCLUDING VIBRATORY MEANS

Raymond G. Amato, 28 Ash Ter., Parlin, N.J. 08859

Filed Apr. 15, 1976, Ser. No. 677,315
Int. Cl.[2] A63B *53/12*
U.S. Cl. 273—80 R **5 Claims**

1. A golf club of the type comprising a golf club head, a tubular shaft having at least a hollow portion, said shaft coupled to said head at one end and handle means located on said shaft at said other end, in combination therewith of apparatus for providing a vibratory effect when said club head strikes a golf ball, comprising:

(a) first and second disk members rigidly secured within said hollow of said shaft and positioned one above the other at a distance along the length of said shaft, and

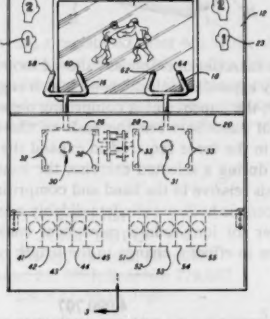
(b) a flexible vibratory member coupled between said first and second disk members and located within said hollow relatively central thereto, said member adapted to vibrate when said club head strikes said ball due to the impact of said club head with said ball to impart a vibratory feel to the hands of a user of said club during said impact, said member comprising at least one wire coupled between said first and second disk members, and a weight member secured to said wire and located relatively at an equal distance from said first and second disks.

4,090,712

ANIMATED GAME

James R. Shields, Jr., R.F.D. #4, Box 110, Canastota, N.Y. 13032

Filed May 25, 1977, Ser. No. 800,159
Int. Cl.[2] A63F *9/00*
U.S. Cl. 273—85 R **12 Claims**



1. An animated game involving player manipulation of visually displayed images comprising:

(a) a viewing surface;

(b) first and second optical projector means;

(c) first and second pluralities of discrete images adapted for optical projection on said viewing surface by said first and second projector means, respectively;

(d) first and second projection control means each effective to cause projection of any of the images from among said first and second pluralities, respectively, at least some of said projection control means being selectively controlled by a player;

(e) first and second image position control means each effective to vary the position on said viewing surface of the image displayed thereon from said first and second pluralities, respectively, at least one of said position control means being selectively controlled by a player; and

(f) scoring means effective to register a score in response to simultaneous player control of said projection control means and said position control means to cause projection of a particular image from one of said pluralities positioned in predetermined relation to the image projection from the other of said pluralities.

4,090,713

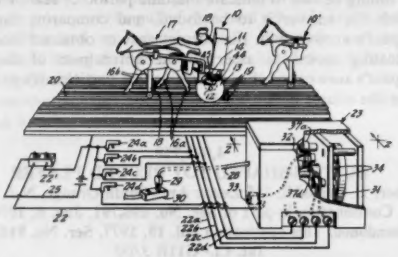
HARNESS HORSE RACING ELECTRIC SYSTEM

Dominic V. DeCesare, 223 Center St., Elizabeth, N.J. 07202

Filed Apr. 21, 1977, Ser. No. 789,688
Int. Cl.[2] A63F *9/14*; H02P *1/58*
U.S. Cl. 273—86 B **10 Claims**

1. A switch selecting device comprising in combination: a plurality of electrical motors each having a separate input electrical lead and a separate output electrical from those of others of the plurality, at least one of the input leads and the output leads respectively being connected in electrical parallel, and the other of the input leads and output leads respectively being connected to separate one of a plurality of circuit making and breaking contacts; cyclic switch means for being connected in electrical circuit with said plurality of contacts each for making and breaking circuit for respective leads connected

thereto, the cyclic switch means being further for providing a plurality of alternate power circuits intermittently and consecutively contactable of each of the circuit making and breaking contacts in repeating cycles and including a drive means for effecting cycling of the cyclic switch means, the drive means including drive switch means for starting and stopping the drive means, each of the plurality of alternate power circuits having power regulator means for determining and controlling total electrical energy passing therethrough per cycle of the cyclic switch means, the power regulator means being different for at least one of the alternate power circuits relative to the power regulator of others of the alternate power circuits; and a power source connected to provide closed-circuit direct current power in circuit to the alternate power circuits and the respective one of the plurality of electrical motors whenever respective ones of the alternate power circuits are in closed-circuit contact with at least one of said plurality of contacts; and activation switch means mounted in series within circuitry



of the closed-circuit direct current power, for opening and closing intermittently circuit of the power source, whereby when the drive switch means is in a starting position such that the cyclic switch means is running and cycling continuously, closing circuit to the activation switch means results in different ones of the plurality of electrical motors receiving driving power in differing and unpredictable amounts within a predetermined time period of activation of the activation switch, and a plurality of second motor means, one matched with each electrical motor of the plurality of electrical motors, for becoming electrically activated each respectively intermittently, each second motor means comprising an electrical commutator in series electrically with an electro-magnetic motor, the electrical commutator being mounted to be driven by a respective one of the plurality of electrical motors, and when driven by the electrical motor the electrical commutator repeatedly intermittently and alternately making and breaking-circuit to circuitry to the electromagnetic motor having its circuitry inclusive of a power source of electrical direct current.

4,090,714

ROPE CONTROLLED PHOTO TARGET

Takehiro Izushi, Kyoto, Japan, assignor to Nintendo Co., Ltd., Kyoto, Japan

Filed Mar. 24, 1977, Ser. No. 780,831

Claims priority, application Japan, Mar. 24, 1976, 51-36243[U]

Int. Cl.[2] F41J *5/02*

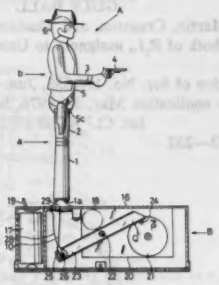
U.S. Cl. 273—101.1 **6 Claims**

1. A target structure for a light emitting shooting apparatus for amusement of the type whereby a light beam, upon a successful shooting, enters into a photoelectric sensitive element from which a signal is generated to effectuate a control circuit to cause said target structure to fall down and display a "hit", wherein said target structure comprises;

a target assembly including at least one supporting segment and at least one target object, said supporting segment having a longitudinal through-hole through which a rope is passed and said target object being provided with a photoelectric sensitive element, thereby the target object taking a standing position, when the rope is in a tight state and taking a fell down position when the rope is loosened;

a rope pulling device which keeps a rope tight; and

a control device for controlling said rope pulling device thereby the rope in tension being loosened in response to an output signal from the photoelectric element of the



target segment, whereby when a shooter is ready for shooting, the supporting segment is caused to take a standing state by giving tension to the rope passing therethrough and when the mark is hit successfully the rope is loosened to cause the supporting segment to fall down and rendering the target object fell down, indicating a hit by the change of the position of the target object.

4,090,715

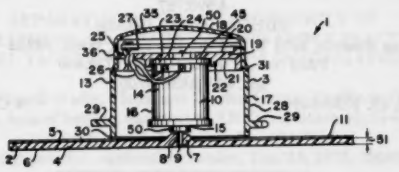
SOLAR POWERED SPINNING APPARATUS

Clyde M. Wagner, and John H. Wagner, both of 108 N. Sparta St., Steeleville, Ill. 62288

Filed Sep. 24, 1976, Ser. No. 726,448

Int. Cl.[2] A63F *5/04*; A63H *29/22*

U.S. Cl. 273—141 A **8 Claims**



1. A solar powered device, comprising:

a support structure, said support structure including an upper surface;

a plate mounted to the upper surface of said support structure, said plate having a plurality of indicia indicated on it;

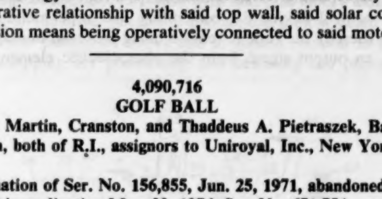
an electric motor, said motor including a stator assembly and a rotor assembly, said rotor assembly having a shaft extending outwardly from said stator and rotor assemblies on at least one end of said motor, said extension being mounted to said support structure, said stator assembly being rotatably mounted with respect to said rotor assembly and said shaft; and

top means mounted to said stator assembly and rotatable therewith, said top means comprising an enclosure having at least one side wall and a top wall, said side wall having pointer means integrally formed with it, individual ones of said indicia of said plate being arranged for alignment with said pointer, said top wall being transparent, said enclosure defining a cavity, means for mounting said enclosure to said stator assembly such that said stator assembly is within said cavity, said mounting means including a mounting plate attached to said enclosure, said mounting

plate having a receptacle formed on a first side of it, said receptacle being sized to interlock with said motor, and solar energy conversion means mounted in said cavity in operative relationship with said top wall, said solar conversion means being operatively connected to said motor.

4,090,716
GOLF BALL

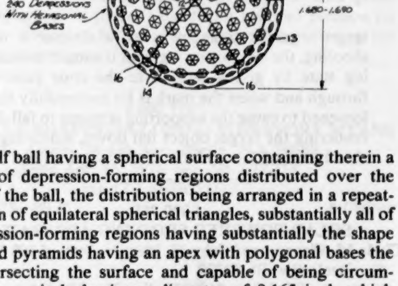
Frank S. Martin, Cranston, and Thaddeus A. Pietraszek, Barrington, both of R.I., assignors to Uniroyal, Inc., New York, N.Y.
Continuation of Ser. No. 156,855, Jun. 25, 1971, abandoned. This application Mar. 30, 1976, Ser. No. 671,754
Int. Cl.[2] A63B *37/12*
U.S. Cl. 273—232 14 Claims



1. A golf ball having a spherical surface containing therein a plurality of depression-forming regions distributed over the surface of the ball, the distribution being arranged in a repeating pattern of equilateral spherical triangles, substantially all of the depression-forming regions having substantially the shape of inverted pyramids having an apex with polygonal bases the bases intersecting the surface and capable of being circumscribed by a circle having a diameter of 0.165 inch which passes through the vertices of the polygonal bases and the depression-forming regions having a depth of 0.015 inch.

4,090,717
EDUCATIONAL GAME

Susan Rossetti, 801½ E. 2nd St., Cle Elum, Wash. 98922
Filed Nov. 8, 1976, Ser. No. 739,460
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—249 4 Claims



1. A game particularly adapted to stimulate participants to improve research skills in using an encyclopedic reference work comprising a plurality of volumes in which information is arranged in said volumes in alphabetically grouped categories, each volume containing alphabetically grouped categories different from that of the other volumes, said game comprising:

a. a game board having a representation of a course, leading from a beginning point to an end point, and divided into increments of travel along which markers can be moved to record progress of a player by moving a related marker along the course,

b. a plurality of separated sets of question and answer indicating means, each set corresponding to a respective volume, and each set having indicia corresponding to indicia on its respective volume, with questions of that set asking for information contained under a category alphabetically contained in its respective volume and normally retrievable from that volume within a pre-determined time range, and answers of that set providing said information, said indicating means arranged to display said questions in a format separate from the answers,

c. a timing device to indicate a time period of search within said time range,

whereby a game participant can maintain progress along the course of the board by the steps of selection of a question, looking into the reference work for a correct answer, utilizing the timing device to indicate the time period of search within which the answer is to be found, and comparing the participant's answer with the correct answer obtained from the indicating means to ascertain the correctness of the participant's answer and thus determine that participant's progress over the course of the board.

4,090,718
BUTTON-SHAPED TOY RECORD PLAYER

Robert L. Grimaldi, 215 Lenox Ave., South Orange, N.J. 07079
Continuation-in-part of Ser. No. 698,791, Jun. 6, 1976, abandoned. This application Jul. 18, 1977, Ser. No. 816,730
Int. Cl.[2] G11B *3/00*
U.S. Cl. 274—1 A 1 Claim

1. A toy record player comprising:

a housing;

a turntable having a shaft concentric therewith, said turntable being hingeably attached to said housing, a record being positionable on said turntable;

drive means attached through said shaft to said turntable for the rotation thereof;

a pick-up tone arm attached to said housing and in contact with the turntable-positioned record for picking up mechanical vibrations from the rotating record;

a loudspeaker attached to said housing and operatively connected to said tone arm for converting said vibrations into accoustical energy;

start-means for activating said drive means and for hingeably swinging said turntable in a radially outward direction from a first position in contact with said tone arm to a second position out of contact therewith during operation of said start-up means, said shaft being located in the second position of said turntable in a position parallel to the position of said shaft in the first position of said turntable, and wherein said housing is a synthetic plastic material in the shape of a cylinder formed with an opening, said

drive means comprises a windable torsion spring positionable substantially concentrically on said turntable in a wound state and having a spring-holding drum disposed eccentrically with respect to said turntable for receiving the unwound spring, a rope or the like passing through said opening, said rope having two ends and attached with one end thereof to said shaft, and a grippable member attached to the other of said ends for said rope to wind up said spring upon being pulled outwards from said housing, and wherein said shaft has an inwardly pointing extremity;

a leaf spring attached to said housing and having first and second indentations for receiving the shaft extremity in said first and second positions of said turntable, respectively;

a shaft-attachable spring for holding the record on said shaft;

a tension spring having two ends, and attached with one end thereof to said housing and with the other end thereof to said turntable for pulling the latter to said first position upon release of the pulled rope, and wherein said housing has first and second substantially flat ends, said loudspeaker being disposed in the vicinity of one of the ends thereof, and

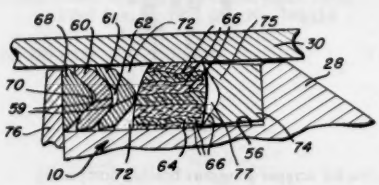
a wearer-attachable pin disposed externally on the other of the housing ends.

4,090,719

PACKING ASSEMBLY

Imantas Simanskis, Hillside, and Richard K. Caldwell, Arlington Heights, both of Ill., assignors to Vapor Corporation, Chicago, Ill.

Filed Mar. 28, 1977, Ser. No. 781,565
Int. Cl.² F16J *15/18*
U.S. Cl. 277—125 **7 Claims**



1. A self lubricating packing for first and second coaxial members, said second member being mounted telescopically within said first member and reciprocated relative to said first member, said packing comprising:

a plurality of packing rings disposed around said second member and in abutting relationship, said rings defining a packing assembly having first and second ends;

a male adaptor abutting a first packing ring, said rings being of a chevron cross-sectional configuration with the first packing ring positioned over said male adaptor defining a channel therebetween for the flow of lubrication, said remaining rings being stacked on each other to define lubrication channels therebetween for the flow of lubrication therethrough;

a lubrication member disposed around said second member and adjacent said first end of said packing assembly; and

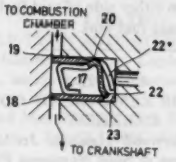
a compression member threadably secured on said second member and abutting said second end of said packing assembly for applying a compressive load on said packing assembly and said lubrication member.

4,090,720

EXPANDER SPRING FOR PISTON RINGS

Martin Morsbach; Paul Jöhren, both of Burscheid, and Jürgen Weiss, Leverkusen, all of Germany, assignors to GOETZEWERKE Friedrich Goetze AG, Burscheid, Germany

Filed Mar. 31, 1977, Ser. No. 783,450
Claims priority, application Germany, Apr. 7, 1976, 2615010
Int. Cl.² F16J *9/00*
U.S. Cl. 277—140 **9 Claims**



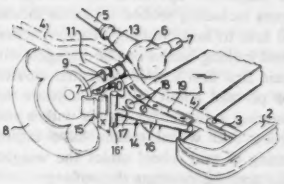
1. In an oil scraper ring assembly positioned in a circumferential groove of a piston operating in a cylinder; the assembly including a sheet metal annular expander spring having an axis and forming an annular channel of generally U-shaped cross section, the channel having two side walls, a base interconnecting the side walls and an open side opposite the base, a plurality of circumferentially distributed slot means provided in the side walls for increasing the resiliency of the expander ring in the circumferential direction, and axially projecting support foot means extending from a radial side of the channel; the assembly further including at least one oil scraper ring being in sliding engagement with a wall of the cylinder and being supported by the expander spring and the support foot means thereof; the improvement wherein one side wall of said channel forms a radially inner, axially oriented side of said expander spring and the other side wall of said channel forms a radially outer, axially oriented side of said expander spring; said radially inner side having a free end formed as said support foot means.

4,090,721

APPARATUS ACTING REINFORCINGLY IN COLLISIONS TO PROTECT REARWARDLY PLACED FUEL TANKS IN VEHICLES FROM DEFORMATION DAMAGES

Sten Henrik Wedin, Floda, and Torsten Gunnar Lindberg, Ockero, both of Sweden, assignors to AB Volvo, Goteborg, Sweden

Filed Jun. 8, 1976, Ser. No. 694,013
Claims priority, application Sweden, Jun. 13, 1975, 7506812
Int. Cl.² B60K *15/08*
U.S. Cl. 280—5 A **6 Claims**



1. In a motor vehicle having a fuel tank, a rear axle forward of the fuel tank, longitudinal frame side members disposed on either side of the fuel tank, said side members each having an upwardly curved portion over the rear axle and a straight horizontal portion behind the rear axle, and means interconnecting the rear axle and said side members; the improvement comprising reinforcing apparatus that acts reinforcingly in collisions to protect the fuel tank, said reinforcing apparatus comprising support means extending substantially in the longitudinal direction of the vehicle and attached to each of said

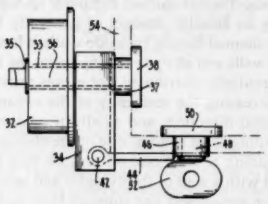
straight portions and having a front end each said support means having at its front end a force-transferring surface which is normally spaced a distance behind an associated rearwardly facing force transferring surface of a support portion which is resistant to deformation, and means mounting said support portion on one of the frame side members adjacent said curved portion and said rear axle and forward of the fuel tank, whereby upon deformation of the rear of said vehicle, said forcetransferring surfaces come into contact with each other and a portion of the forces causing said deformation are led past the fuel tank on either side of said fuel tank thereby to avoid deformation of said fuel tank.

4,090,722

APPARATUS FOR REMOVAL OF CONTAINER CARRIERS

Garnet Marshall Underwood Hannan, Jerilderie, Australia, assignor to G. Hannan & Sons Nominees Proprietary, Limited, Australia

Filed Jun. 22, 1976, Ser. No. 698,593
Int. Cl.[2] B62B *11/00*
U.S. Cl. 280—47.32 **6 Claims**



1. An assembly of a container carrier and a plurality of wheel means detachably mounted thereon, said container carrier comprising a generally rectangular container carrier having a top, bottom and sides thereof, a plurality of apertures located proximate each corner of at least two adjacent corners, each plurality of apertures including at least one aperture on each side of said container adjacent said corner, said wheel means comprising a wheel, an axle means for rotatably mounting said wheel, a mounting bracket having a first arm and a second arm, said axle means mounted on said first arm, first mounting and locking means on said first arm for insertably registering with a respective aperture, said first mounting and locking means including first rotatable means for securing said mounting bracket to said container carrier, pivot means for pivotally mounting said second arm to said first arm, second mounting and locking means on said second arm for insertably registering with a respective aperture, said second mounting and locking means including second rotatable means for securing said second arm to said container carrier, whereby said first mounting and locking means can be engaged with an aperture to mount said first arm to said container carrier, said second arm can be pivoted about said pivot means to engage said second mounting and locking means with a respective aperture, whereby said wheel means have improved stability against canting of said wheel under the weight of said container carrier and the contents thereof.

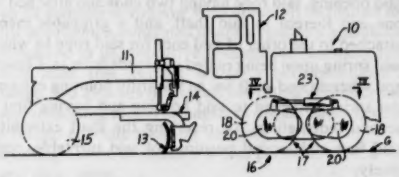
4,090,723

TANDEM ROADWHEEL LEVELING SYSTEM FOR CONSTRUCTION VEHICLES

Cullen P. Hart, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jan. 24, 1977, Ser. No. 761,928
Int. Cl.[2] B60G *17/00*
U.S. Cl. 280—6 H **10 Claims**

1. A construction vehicle comprising
a frame,
a pair of tandem roadwheel assemblies mounted on each lateral side of said frame,
pivot means pivotally mounting each of said roadwheel assemblies on said frame, and



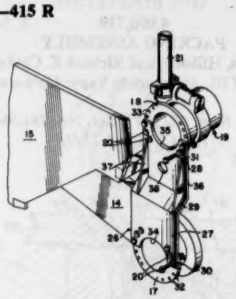
actuating means comprising a single double-acting cylinder interconnected directly between said pair of roadwheel assemblies for pivoting said roadwheel assemblies simultaneously and in unison relative to each other and relative to said frame to selectively vary the vertical height of said frame relative to ground level.

4,090,724

TRACTOR-SCRAPER TRANSPORT BRACKET

Thomas R. Hamilton, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 438,285, Jan. 31, 1974, Pat. No. 3,893,250.
This application Jan. 9, 1975, Ser. No. 539,780
Int. Cl.[2] B60F *1/14*
U.S. Cl. 280—415 R **5 Claims**



1. A tractor scraper transport bracket comprising
longitudinally spaced first and second end portions integrally connected together in offset relationship by an intermediate portion, and
mounting means formed at each of the first and second end portions of said transport bracket for attaching said bracket to an end of a draft arm and to a draft tube of a tractor scraper, each of said mounting means comprising a plurality of holes formed through a respective end portion of said transport bracket and disposed in semi-circular relationship thereon.

4,090,725

DEVICES FOR AUTOMATICALLY COUPLING IMPLEMENTS TO SELF-PROPELLED VEHICLES

Philippe Périn, Meudon, France, assignor to Sté Fiat France S.A., France

Filed Mar. 11, 1976, Ser. No. 666,011
Claims priority, application France, Mar. 19, 1975, 75 08579
Int. Cl.[2] B60D *1/08*
U.S. Cl. 280—479 A **10 Claims**

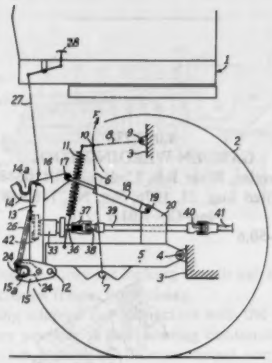
1. In a self-propelled vehicle,
a chassis, and
a device mounted on the chassis for automatically coupling

an implement having an upper and a lower supporting bar to the vehicle, said device comprising

a rigid member having opposed end portions, said member being pivotally connected at one end portion to the chassis and extending generally horizontally,

lifting means pivotally mounted on its one end to a chassis,

suspension means connecting said rigid member to the lifting means,



a hitching frame pivotally mounted at the lower end portion of the rigid member, said hitching frame including a pair of upper jaws engageable with said upper supporting bar and a pair of lower jaws engageable with said lower supporting bar for engaging the implement, and

a double-acting ram operative to pivot the hitching frame and extending between the rigid member and the upper end portion of the hitching frame.

4,090,726

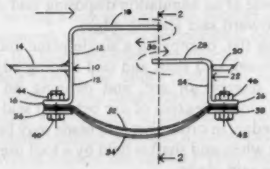
FLEXIBLE COUPLING FOR CONDUITS

Howard T. Mischel, c/o Pathway Bellows, Inc., Callahan Mining Corporation, Box 1526, El Cajon, Calif. 92022

Filed Jan. 17, 1977, Ser. No. 760,114

Int. Cl.[2] F16L *27/02*

U.S. Cl. 285—229 **7 Claims**



1. A flexible expansion joint for connecting the spaced ends of two conduits for conveying a high temperature fluid stream in one direction and which expand and contract axially toward and away from each other and also move laterally and radially with respect to each other including frame members attached to the end portions of each conduit and extending away from the perhiers of the conduits and a flexible belt-like structure connected to the outer portions of said frame members to bridge the space between the ends of said conduits while being radially spaced outwardly from said space, between the ends of said conduits the combination of:

baffling mechanism attached to at least one of said conduits and bridging the space therebetween and extending downstream toward the axis of said conduits,

said baffling mechanism including radially spaced portions to form a continuous space therebetween facing away from said stream,

whereby said frame members, said belt-like structure and said baffling mechanism form an enclosure except for said continuous space and

means forming a flexible obstruction spanning said continuous space and attached to said baffling mechanism.

4,090,727

HALF-TURN ACTUATED MEMBER

Kieran Busch, Gloversville, and Cuyler Hoen, Rennesselaer, both of N.Y., assignors to Simmons Fastener Corporation, Albany, N.Y.

Filed May 25, 1977, Ser. No. 800,231

Int. Cl.[2] E05C *3/16*

U.S. Cl. 292—11 **8 Claims**

1. An industrial fastener comprising a keeper plate member to be fastened to one panel and a turn member to be fastened to another panel;

said turn member comprising a base member, a sleeve member having a central portion having therein an opening and opposed side portions forming a sleeve, and hinge means connecting said base member and said sleeve member to permit turning motion of said sleeve member relative to said base member;

said turn member further comprising a slide member which slides within said sleeve, to be extended or withdrawn, and has an elongated cam opening;

a first disk member of sheet metal having a hole therethrough, which first disk fits within the opening in said sleeve member and is rotatable therein;

a second disk member of sheet metal having opposed side indentations and a hole therethrough.

a third disk member of resilient steel having a hole therethrough;

a cam member connected through said holes in said first disk member, said second disk member and said third disk member to connect said three disks together, said cam member protruding through said sleeve member opening and said cam opening; said cam member being eccentric as to the center of said first disk;

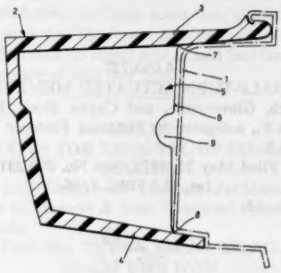
turning means having finger portions which fit in said indentations and which turning means may be turned to move said cam member about the said center of said sleeve member opening and within said cam opening to thereby slide and withdraw said slide member and pull together said hook-like member and said turn member.

4,090,728

BUMPER ARRANGEMENT

Wolfgang Riedel, Braunschweig, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Germany

Filed Mar. 21, 1977, Ser. No. 779,731
Claims priority, application Germany, Apr. 10, 1976, 2615747
Int. Cl.[2] B60R *19/08*
U.S. Cl. 293—71 R 1 Claim



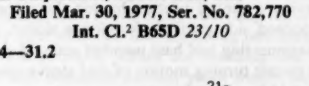
1. A bumper for an object to be protected, such as a motor vehicle, with a closed profile-section support means comprised of a rigid rear support means and a front hollow section made of deformable material, said hollow section being fixed on the rigid support means with two freely extending shank portions of said hollow section, said hollow section containing reinforcing ribs each having a linearly extending free edge and each extending between said shank portions with said free edge arranged opposite and at least approximately parallel to the front portion of said rigid support means for supporting said hollow section on impact, the improvement wherein at least some of said reinforcing ribs have a single semi-circular recess, the recess being located in the mid-zone of said free edges for relieving tensile forces at both ends of said edges, said recesses having a diameter which is substantially smaller than the length of said edges.

4,090,729

BOTTLE CARRIER

Gerald Erickson, Palm Beach, Fla., assignor to International Omni-Pak Corporation, Palm Beach, Fla.

Filed Mar. 30, 1977, Ser. No. 782,770
Int. Cl.[2] B65D *23/10*
U.S. Cl. 294—31.2 8 Claims



1. A bottle carrier for carrying a single bottle from the neck comprising a frame having an opening therein, a split collar within the opening for receiving the neck of a bottle, the split collar being tapered inwardly from the lower edge toward the upper edge to facilitate the insertion of the neck of the bottle, bridging means connecting the outer tapered surface of the split collar to the frame defining the opening in order to support the split collar within the opening and permit spreading of the split ends to facilitate the insertion and removal of the neck of a bottle, said frame being longer in one direction than another to define diametrically opposite outwardly extending ends of said frame for toting the bottle carrier, an inner reinforcing portion of the frame around said opening, an outer reinforcing portion of the frame around the inner reinforcing portion for toting the bottle carrier and means connecting the inner and outer frame portions.

4,090,730

GARDEN WEEDING TOOL

Philip Carl Zeigler, River Rd., Underhill, Vt. 05489

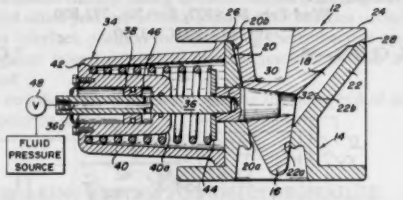
Filed Aug. 23, 1976, Ser. No. 716,948
Int. Cl.[2] A01B *1/16*
U.S. Cl. 294—50.6 3 Claims

1. A garden weeding tool, comprising:
a blade with a serrated edge; and
means coupled to said blade for supporting and providing leverage to said blade; wherein
said blade has opposite, terminal ends and leading and trailing edges;
said leading edge is said serrated edge;
said coupled supporting means comprises a shaft extending from said blade at an angulation disposing said shaft at an inclination toward said leading edge;
said blade being flat, occupying a single plane and defining an angle between said shaft and said leading edge, of less than ninety degrees of arc, and defining an angle of greater than ninety degrees of arc between said shaft and said trailing edge, in order that said blade may be disposed horizontally when said shaft is held by a tool user forward of and above said blade;
said serrated, leading edge having a plurality of serrations formed therein;
each of said serrations of the plurality thereof being defined by a recess having substantially V-shaped opposed walls, said walls mutually converging inwardly from said leading edge;
said shaft is coupled to one of said terminal ends, and includes a handle for the manipulation of said tool;
said handle comprises a grip-shaped component having a normal gripping configuration which is oriented generally to cause a gripping thereof to be directed generally in transverse of said blade in order that a pulling force applied to said tool will be directed along a plane which is generally intermediate of said leading edge and in traverse of said blade; and
said handle has threads formed therein on its furthermost extended end to facilitate the attachment thereto of an extension to said handle.

4,090,731
TILT-CAB LOCKING MEANS

Robert D. Bopp, and David P. Klosterman, both of Moberly, Mo., assignors to Orscheln Brake Lever Mfg. Co., Moberly, Mo.

Filed Sep. 14, 1976, Ser. No. 721,976
Int. Cl.[2] B62D *27/06*
U.S. Cl. 296—28 C 4 Claims



1. A locking assembly for locking the tilt cab of a vehicle to the vehicle chassis frame, comprising

(a) a housing adapted for connection with the chassis frame, the upper portion of said housing containing a cavity of rectangular horizontal cross-sectional configuration including downwardly converging opposed pairs of side walls;

(b) a blade member adapted for connection at its upper end with the tilt cab, said blade member being arranged to extend downwardly in seated relation within said housing cavity when the tilt cab is in the lowered position relative to the chassis frame, said blade member having a rectangular horizontal cross-sectional configuration and including downwardly convergent opposed pairs of outer surfaces which correspond generally with said cavity wall surfaces, respectively, said blade member containing a horizontally extending locking opening;

(c) a horizontally arranged locking pin connected with a first cavity wall of said housing for axial displacement between locked and unlocked positions relative to said locking opening; and

(d) means for displacing said locking pin between its locked and unlocked positions;

(e) said second housing cavity wall opposite said first cavity wall having a lower portion in parallel contiguous seated engagement with the corresponding outer blade surface when the blade member is completely inserted within said housing cavity, the upper portion of said second cavity wall being inclined outwardly from the lower wall portion to define an increased target area for facilitating entry of said blade member into said housing cavity as the tilt cab is lowered toward the chassis frame, said first cavity wall and the pair of opposed cavity walls contiguous therewith terminating at their upper ends in a common horizontal upper housing surface, the upper edge of said second cavity wall terminating in a horizontal ledge positioned below the plane of said housing upper surface, said blade member including horizontal flange portions arranged for seating engagement with said housing upper surface when the tilt cab is in the lowered position, said blade member also including a depending portion arranged for seating engagement with said ledge when the tilt cab is in the lowered position.

4,090,732
VEHICLE SUN VISOR

Anatoli Vistitsky, 1527 W. Chase, Chicago, Ill. 60626

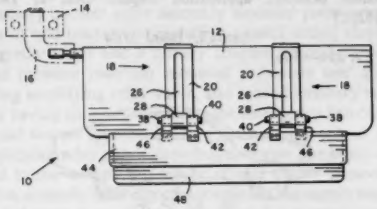
Filed Apr. 7, 1977, Ser. No. 785,421
Int. Cl.[2] B60J *3/02*
U.S. Cl. 296—97 C 6 Claims

1. A vehicle sun visor comprising:

an opaque panel adapted to be positioned in front of a windshield of a vehicle,

at least one track having an elongated slot therein mounted on said opaque panel,

a bearing slidable along said slot in said track,



said bearing having a pair of laterally extending pintles,

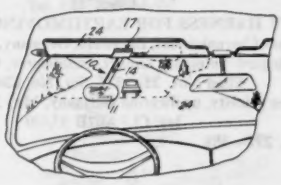
a first semi-transparent tinted panel rotatably mounted on one of said pintles, and

a second semi-transparent panel rotatably mounted on the other of said pintles.

4,090,733
STORABLE GLARE ELIMINATING DEVICE

Louis T. Altschul, 1701 E. Lake St., Glenview, Ill. 60025

Filed Nov. 1, 1976, Ser. No. 737,535
Int. Cl.[2] B60J *3/00*
U.S. Cl. 296—97 B 10 Claims



1. A storable glare eliminating device for use on vehicles, comprised of:

a flat support arm;

a flat shielding portion of an opaque material pivotally attached at its center to one end of said support arm; and

a mounting means for said support arm,

said mounting means being constructed of a resilient material formed as a one-piece member having a bight portion interconnecting a pair of of legs having means for gripping formed on the ends thereof,

said bight portion resiliently urging the ends of said legs towards each other so that said means for gripping will grippingly engage the sun visor of the vehicle inserted therebetween;

pivot means in said bight portion providing pivotal movement of said support arm in a plane generally perpendicular to the sun visor;

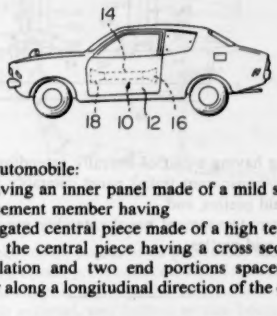
whereby said storable glare eliminating device can be horizontally positioned by selectively sliding said mounting means along the surface of the gripped portion of the vehicle, and can be vertically adjusted by the radial movement of said support arm to position the shielding portion in any selected area to obscure objectionable sunlight or headlights of on-coming vehicles, and can be stored by positioning said shielding portion generally in line with the visor.

4,090,734

REINFORCEMENT MEMBER FOR AN AUTOMOBILE DOOR

Sumio Inami; Kiyoshi Koike; Masayoshi Hayashida, and Shigeyuki Yamaoka, all of Yokohama, Japan, assignors to Nissan Motor Company, Ltd., Japan

Filed Sep. 24, 1976, Ser. No. 726,192
Claims priority, application Japan, Oct. 1, 1975, 50-134162[U]
Int. Cl.[2] B60J 5/04
U.S. Cl. 296—146 3 Claims



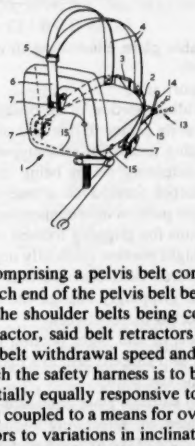
1. In an automobile:
a door having an inner panel made of a mild steel;
a reinforcement member having
an elongated central piece made of a high tensile strength steel, the central piece having a cross section with an undulation and two end portions spaced from each other along a longitudinal direction of the central piece, and
two end pieces made of a similar mild steel to the mild steel of which said inner panel is made, the two end pieces being secured to the central piece at the two end portions of the central piece, respectively, the two end pieces being formed with attachment areas, respectively, and being welded at that attachment areas to the inner panel of said door.

4,090,735

SAFETY HARNESS FOR EARTHMOVING EQUIPMENT

Waldemar Czernakowski, Blaustein, Germany, assignor to Romer-Wingard Autogurte GmbH, Blaubeurer, Germany

Filed Nov. 21, 1975, Ser. No. 634,151
Claims priority, application Germany, May 28, 1975, 2525144
Int. Cl.[2] A62B 35/00
U.S. Cl. 297—388 3 Claims



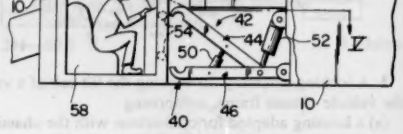
1. A safety harness comprising a pelvis belt connected to a pair of shoulder belts, each end of the pelvis belt being coupled to a belt retractor and the shoulder belts being coupled to at least one other belt retractor, said belt retractors being lockable in response to both belt withdrawal speed and the inclination of a vehicle to which the safety harness is to be fitted, the retractors being substantially equally responsive to inclination and said retractors being coupled to a means for overriding the response of said retractors to variations in inclination, each of said belt retractors including a self-winding reel which rotates together with a ratchet wheel, each retractor also including a pawl and a gravity displaceable member, said gravity displaceable member being arranged to move said pawl into locking engagement with said ratchet wheel, and said overriding means acting on said pawl either to maintain its inoperative position, or to release it for movement by said gravity displaceable member.

4,090,736

DETACHABLE CAB CONSTRUCTION FOR MINING MACHINES

James L. Finney, Cranbury, N.J., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Feb. 24, 1977, Ser. No. 771,500
Int. Cl.[2] E21C 33/00
U.S. Cl. 299—30 7 Claims



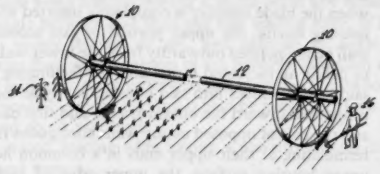
1. In combination, a mining machine and a detachable cab for said mining machine, said combination comprising remotely controlled means operably interrelating said mining machine and said cab including means for detachably mounting said cab on said mining machine for movement therewith and for detaching said cab from said mining machine so that said mining machine can move independently of any movement of said detached cab from a then normally stationary disposition thereof, said remotely controlled means comprising clamping means for releasably clamping said detachable cab into position on said mining machine, and said cab including other remote control means located thereon for controlling said mining machine when said cab is detached therefrom.

4,090,737

AGRICULTURAL SPOKE WHEEL

Arthur E. Jensen, 11372 SW. Skyline, Santa Ana, Calif. 92705

Filed Oct. 7, 1976, Ser. No. 730,540
Int. Cl.[2] B60B 23/00
U.S. Cl. 301—12 R 7 Claims



1. A wheel construction for agricultural apparatus comprising:
a rim,
a hub,
spokes extending from said hub to said rim,
each spoke having at its inner end a generally S-bend forming a pair of laterally offset longitudinal spoke portions joined by an intervening transverse spoke portion,
a sheet metal flange surrounding said hub in a transverse plane of said hub and having a hole for each spoke inwardly from the flange edge through which said transverse portion of the respective spoke extends with said offset spoke portions located at opposite sides of the flange, whereby each spoke is rotatable relative to its flange between an interlock position wherein the spoke extends laterally out from said hub to said rim with its

offset spoke portions seating against opposite sides of said flange to interlock the spoke against endwise movement relative to the flange, and a release position wherein the spoke extends generally longitudinally of said hub for endwise withdrawal of the spoke from its respective flange hole,

the outer edge of said flange being turned to form sheet metal lip means projecting beyond one side of and extending circumferentially about said flange, and providing circumferentially facing shoulder means engaging one of said offset portions of each spoke when the latter occupies its interlock position for restraining the respective spoke against lateral movement circumferentially of said hub, and

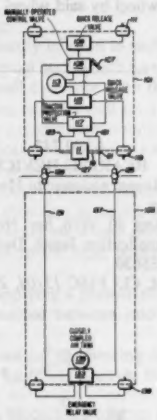
rim coupling means releasably joining the outer end of each spoke to said rim.

4,090,738

BRAKING SYSTEM FOR TRACTOR-TRAILER COMBINATIONS

Robert J. Bray, Huntington Woods, Mich., assignor to Brake Systems, Inc., Detroit, Mich.

Filed Jan. 21, 1976, Ser. No. 650,861
Int. Cl.[2] B60T *13/00*
U.S. Cl. 303—7 **6 Claims**



1. In a tractor/semi-trailer combination including a tractor having a front, a rear and tractor brakes and a semi-trailer having a front, a rear and semi-trailer brakes, an improved braking system for reducing the fluid pressure delivery time to the brakes of the semi-trailer to eliminate "jackknifing" due to trailer overrun, said braking system comprising:

a pair of tractor brake actuators;

a quick release valve coupling said pair of tractor brake actuators;

a pair of semi-trailer brake actuators;

an emergency relay valve mounted proximate the rear of said semi-trailer for operating said semi-trailer brake actuators, said emergency relay valve having an output coupled to said pair of semi-trailer brake actuators, an emergency line input, a closely coupled auxiliary supply of fluid pressure coupled to a supply input, and a service line control input;

manually-operated control valve means having a foot pedal mounted in said tractor and a control valve output for delivering a control pressure signal for controlling the application of fluid pressure to said pair of tractor brake actuators;

a reservoir mounted on said tractor for storing a supply of fluid pressure, said reservoir including a line for supplying fluid pressure of said manually-operated control valve means and an emergency line output;

a tractor protection valve mounted proximate the rear of said tractor and having a service line input coupled to the control valve output of said manually-operated control valve means, an emergency line input coupled to the emergency line output of said reservoir, a service line output and an emergency line output; and

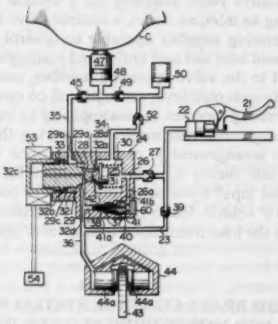
an auxiliary booster valve assembly mounted proximate the rear of said tractor and including a quick-acting amplifying relay valve and a closely coupled second auxiliary fluid pressure reservoir mounted proximate said quick-acting amplifying relay valve, said second auxiliary reservoir having an input coupled to the emergency line output of said tractor protection valve and a supply output, said amplifying relay valve including a service line input coupled to the service line output of said tractor protection valve, a supply input directly coupled to the supply output of said second auxiliary reservoir and a control output coupled to the service line control input of said emergency relay valve, said quick-acting amplifying relay valve further including volumetric displacement means responsive to the fluid pressure received at said service line input for rapidly relaying a corresponding fluid pressure to the service line control input of said emergency relay valve to minimize the time lag between the operation of the tractor brakes and the application of the semi-trailer brakes to eliminate "jackknifing".

4,090,739

VEHICLE ANTI-SKID BRAKE SYSTEM INCLUDING RESTRICTED BY-PASS FLOW PASSAGE

Toshimitsu Iio, Hamamatsu, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Japan

Filed Aug. 11, 1976, Ser. No. 713,489
Claims priority, application Japan, Aug. 14, 1975, 50-98110
Int. Cl.[2] B60T *8/02*
U.S. Cl. 303—10 **5 Claims**



1. Anti-skid vehicle brake system comprising brake master cylinder means for producing fluid pressure when actuated, fluid pressure operated wheel brake actuating means, brake pressure supply passage means between said master cylinder means and said brake actuating means, skid control valve means provided in said brake pressure supply passage means, said skid control valve means having a normal operating position wherein the brake pressure supply passage means is opened to connect the master cylinder means with the brake actuating means, a brake pressure releasing position wherein the brake actuating means is connected with low pressure zone of the system so that the pressure in the brake actuating means is released and a blocking position between said two positions wherein the brake pressure supply passage means is blocked, bypass passage means provided in the brake pressure supply passage means across the control valve means and having

adjustable means therein for restricting to a predetermined minimum the flow of fluid therein, said adjustable means being adjusted such that said bypass passage means is always at least partially open, skid control means for producing an output which is used to energize the valve means to shift it to the pressure releasing position when it is sensed that vehicle wheel is being locked to an extent that skidding may be produced, means being provided for hydraulically holding the control valve means at the blocking position by prohibiting the valve means from returning beyond said blocking position to said normal position after it has been energized and then de-energized so that fluid pressure can be supplied only through the restricted bypass passage means.

4,090,740

LOAD SENSITIVE BRAKE CONTROL VALVE ASSEMBLIES

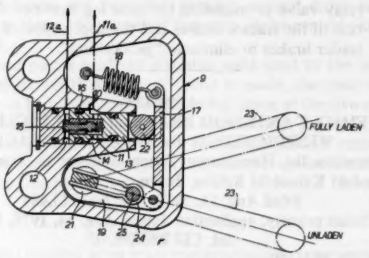
Glyn Phillip Reginald Farr, Tyseley, England, assignor to Girling Limited, Birmingham, England

Filed Feb. 10, 1977, Ser. No. 767,328

Claims priority, application United Kingdom, Feb. 11, 1976, 5482/76

Int. Cl.² B60T *8/18, 8/26*

U.S. Cl. 303—22 R **13 Claims**



1. A control valve assembly for a vehicle braking system, comprising an inlet, an outlet, a control valve having a control valve operating member operable to control communication between said inlet and said outlet, and loading means for applying a load to the valve operating member, said loading means comprising a pivoted lever arrangement co-operating with said valve operating member, means applying an input force to said lever arrangement, and means for varying the lever ratio of said lever arrangement in dependence upon vehicle loading, wherein said means applying said input force is a resilient means, said input force being substantially constant and independent of vehicle loading, whereby variations in the lever ratio vary the load transmitted to said valve operating member.

4,090,741

ANTI-SKID BRAKE CONTROL SYSTEM WITH CIRCUIT FOR MONITORING SLOWER WHEEL

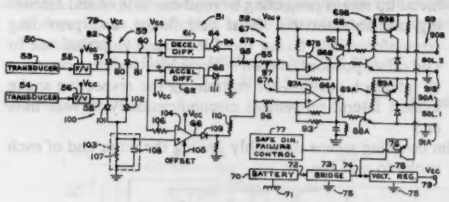
Yudh Vir Rajput, Dayton, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Feb. 22, 1977, Ser. No. 770,535

Int. Cl.² B60T *8/02*

U.S. Cl. 303—96 **15 Claims**

1. An anti-skid brake control system for overriding manual operation of the brakes of a vehicle having a plurality of wheels, comprising detector means for detecting the rate of change of rotation of the more slowly rotating one of at least two of said wheels, including transducer means for producing a plurality of electrical signals respectively representative of the speeds of said wheels, means for selecting the electrical signal representative of the more slowly rotating one of said wheels, deceleration differentiating means for differentiating such selected electrical signal to produce a deceleration signal representative of the deceleration of said one wheel, and acceleration differentiating means for differentiating such selected electrical signal to produce an acceleration signal representative of the acceleration of the said one wheel; wheel lock detector means for detecting the locking of at least one of said wheels, said wheel lock detector means having memory circuit means operatively coupled to said detector means for storing an electrical signal representative of the speed of at least one of said wheels, and comparator means for detecting a change in



an electrical signal indicative of the actual speed of the more slowly rotating one of said wheels at a rate exceeding that at which said memory circuit discharges such stored electrical signal; and control means for effecting such overriding in response to detection of a predetermined deceleration or acceleration as represented by the magnitudes of such deceleration signal and acceleration signal, respectively, by said detector means or a locked wheel by said wheel lock detector means.

4,090,742

BEARING DEVICE

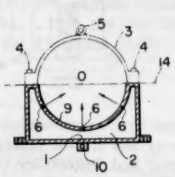
Iwao Ueda, Izumi, Japan, assignor to Hamana Iron Works Co., Ltd., Izumi, Japan

Filed Aug. 30, 1976, Ser. No. 718,503

Claims priority, application Japan, Dec. 23, 1975, 50-154563; May 15, 1976, 51-055630

Int. Cl.² F16C *13/04, 27/00*

U.S. Cl. 308—9 **12 Claims**



1. A pressurized gas type bearing device for rotationally supporting a shaft, comprising:

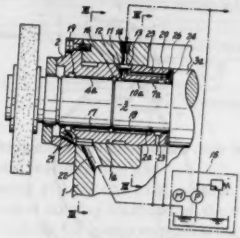
a box type member having a semi-cylindrical wall, side walls and a bottom wall, all defining an enclosed space therein, said semi-cylindrical wall having a plurality of minute holes directed towards the imaginary center of said semi-cylindrical wall which is external to said box type member, a pressurized gas inlet provided in said side walls or bottom wall of said box type member for introducing a gas under pressure into said enclosed space;

whereby, due to injection of gas through said minute holes, a boundary layer of pressurized air is formed between the surface of said semi-cylindrical wall and the outer surface of a rotary shaft surrounded at least partially by said semi-cylindrical wall so that said rotary shaft may be supported by the pressurized gas in a stable manner, with the axis of said shaft being in coincidence with the imaginary center of said semi-cylindrical wall surface.

4,090,743
FLUID BEARING INCLUDING BOTH HYDRODYNAMIC AND HYDROSTATIC BEARINGS

Hiroshi Suzuki, Okazaki; Toshio Tsujiuchi, Anjo, and Masanobu Goto, Kariya, all of Japan, assignors to Toyoda-Koki Kabushiki-Kaisha, Japan

Filed Jan. 17, 1977, Ser. No. 759,675
Claims priority, application Japan, Feb. 17, 1976, 51-16229
Int. Cl.[2] F16C *35/00*
U.S. Cl. 308—9 **6 Claims**



1. A fluid bearing for rotatably supporting a rotary shaft subject to a radial load at one end of the fluid bearing comprising:

a stationary housing;

a bearing bushing fixedly inserted in said stationary housing and having an internal bore which forms a bearing surface defining a first small clearance with the rotary shaft;

a plurality of bearing pads formed on a loaded side of the bearing surface in a circumferential direction and defining a second small clearance with the rotary shaft which is larger than the first clearance;

a plurality of fluid pockets formed on the bearing surface in a circumferential direction in axially juxtaposed relationship with said bearing pads and defining a third small clearance with the rotary shaft which is larger than the first clearance;

supply means for supplying a pressurized fluid;

throttle means connected between said supply means and said fluid pockets;

exhaust means formed on the bearing surface outside said bearing pads and said fluid pockets for discharging pressurized fluid; and

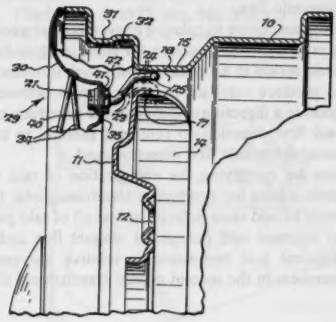
an annular partition groove formed on the bearing surface between said bearing pads and said fluid pockets for supplying pressurized fluid from said fluid pockets to said bearing pads.

4,090,744
VEHICLE WHEEL DISC LOCKING MEANS

Lewis D. McCauley, 745 Le Brun Rd., Eggertsville, N.Y. 14226

Filed Nov. 4, 1976, Ser. No. 738,760
Int. Cl.[2] B60R *19/00*
U.S. Cl. 301—37 AT **6 Claims**

1. For use in combination with a vehicle wheel having a wheel cover disc applied exteriorly thereto, disc locking means comprising a locking element comprising a shank portion and a head formation at the outer end thereof, said shank portion extending through an opening in said disc, said locking element having a threaded portion between said head formation and said shank portion which threaded portion projects through the shank receiving opening of said disc, and nut means at the inner side of said disc for engagement with said threaded portion to retain the locking element against axial movement while permitting rotation thereof, said shank portion having an angular terminal portion adapted in one rotative position to pass through an opening in said wheel and, upon rotation from said position, to engage behind a portion of said wheel adjacent to said opening to prevent disassembly of said disc from said wheel, said head formation being formed to receive a key

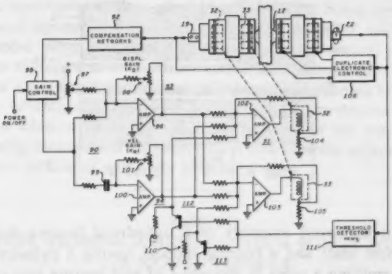


wrench whereby the locking element may be rotated only by means of the key wrench.

4,090,745
MAGNETIC SUSPENSION WITH MAGNETIC STIFFNESS AUGMENTATION

James R. Dohogne, and Ajit V. Sabnis, both of Phoenix, Ariz., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Jan. 14, 1974, Ser. No. 433,431
Int. Cl.[2] F16C *39/00*
U.S. Cl. 308—10 **6 Claims**



1. Suspension apparatus for suspending one member relative to another, one of said members being fixed and the other being movable relative thereto in at least first and second orthogonal, translational directions by means of at least a pair of spaced magnetic bearing means, each bearing means comprising:

a first magnetically permeable core means carried by one of said members and a second magnetically permeable core means carried by the other of said members, said first and second core means having cooperative pole pieces so relatively shaped and juxaposed as to define at least four successive magnetically permeable gaps therebetween adapted to conduct magnetic flux lines of force generally parallel to the first of said translational directions,

permanent magnet means carried by one of said core means for producing a constant magnetic flux of one polarity across said first and fourth gaps and of the opposite polarity across said second and third gaps whereby the resultant magnetic forces acting between said core poles tend to oppose relative movement of said members in the second of said translational directions and simultaneously to produce unstable relative movement of said members in the first of said directions,

at least a pair of electromagnetic means also carried by said one core means adapted when energized to produce variable magnitude electromagnetic fluxes of one polarity across said first and second gaps and simultaneously of the

opposite polarity across said third and fourth gaps, whereby all of said gaps are threaded by both constant permanent magnetic flux and variable magnitude electromagnetic flux,

means responsive to relative movement between said members in said first direction for energizing said electromagnetic means in accordance with such movement whereby to produce resultant magnetic forces between said core poles in a direction and magnitude to reduce movement in said first direction to zero and thereby to stabilize said members in said first direction, and

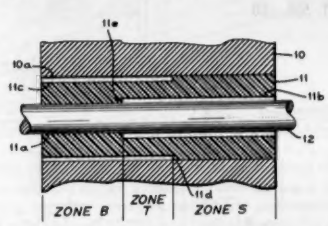
means for modifying the energization of said electromagnetic means for producing electromagnetic flux components of same polarity across all of said gaps whereby to augment said permanent magnet flux and thereby to augment said opposition to relative movement of said members in the second of said translational directions.

4,090,746

PRESS FIT BEARING RETAINING BEARING SIZE WHEN INSERTED INTO SUPPORT

Samuel Jordan Harkins, Lansdale, and Curtis Robert Alvin Johnson, Flourtown, both of Pa., assignors to Leeds & Northrup Company, North Wales, Pa.

Filed Apr. 1, 1977, Ser. No. 783,592
Int. Cl.[2] F16C *27/06*
U.S. Cl. 308—26 **4 Claims**



1. An improved assembly of a cylindrical bearing for a cylindrical shaft and a bearing support having a cylindrical hole permitting a press fit mounting of said bearing into said hole without requiring resizing of said bearing to accommodate said shaft, said assembly comprising:

an axially extending bearing zone in which said cylindrical bearing has an inner bore of diameter to provide a bearing surface for said shaft and an outer diameter of said bearing less than the diameter of said hole to provide an annular space between said bearing and said bearing support to prevent contact between said bearing support and said bearing within said bearing zone,

an axially extending support zone axially spaced from said bearing zone in which said cylindrical bearing has an inner bore of diameter greater than said diameter of said inner bore in said bearing zone and an outer diameter providing a press fit with said hole in said bearing support, and

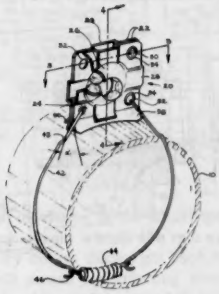
an axially extending transition zone between and connecting said bearing zone and said support zone in which said bearing has an inner bore of diameter greater than said diameter of said inner bore in said bearing zone and said outer diameter of said bearing is less than the diameter of said hole to provide an annular space between said bearing and said bearing support whereby deformation of said bearing produced by said press fit between said bearing and said bearing support in said support zone is absorbed by said transition zone in avoidance of deformation of said inner bore of said bearing in said bearing zone.

4,090,747

SELF PURGING BEARING AND BRACKET FOR DRIVE SHAFT OF A WHEEL MOVE IRRIGATION LINE

Arthur E. Jensen, 11372 SW. Skyline, Santa Ana, Calif. 92705

Filed Nov. 26, 1976, Ser. No. 745,391
Int. Cl.[2] F16C *35/00*
U.S. Cl. 308—30 **4 Claims**



1. A self purging drive shaft bearing for a wheel move irrigation pipe line comprising:

a bearing bracket including a pair of plates disposed in face to face contact and having central coaxial openings through which the irrigation pipe line drive shaft is adapted to extend, and means joining said plates,

said plates having first spaced confronting annular wall portions about said opening which are curved in cross-sectional planes containing the common axis of said openings and form between said wall portions a generally toroidal radially inwardly opening bearing race,

ball bearings within said bearing race for rotatably supporting said drive shaft,

said plates having second spaced confronting wall portions radially outward of said bearing race forming channels circumferentially spaced about said bearing race and extending radially from said bearing race to the outer perimeter of said bracket through which water may pass to flush dirt and other debris from said bearing race,

said plates having spaced corresponding edge portions along one edge of said bracket forming legs for seating against said irrigation pipe line, and

said legs forming therebetween a flow space open at its ends and communicating with one of said channels through which water may pass.

4,090,748

DEVICE FOR LUBRICATING REAR BUSH IN EXTENSION HOUSING OF AUTOMOTIVE TRANSMISSION

Hiroshi Sugimoto, Aichi, and Kazuyoshi Nishikawa, Toyota, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

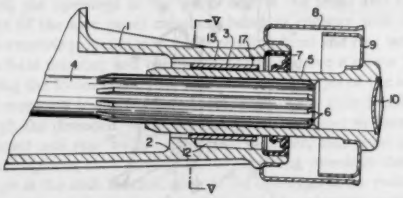
Filed Aug. 25, 1976, Ser. No. 717,666
Claims priority, application Japan, May 31, 1976, 51-63101
Int. Cl.[2] F16C *1/24*; F01M *1/00*
U.S. Cl. 308—121 **6 Claims**

1. A rear bushing lubrication device for use in an automotive transmission of the type in which a cylindrical hollow rear bushing having a bore with an inner surface, an upper portion and front and rear ends, with a front space in front of said rear bushing and a rear space behind said rear bushing, and in which said rear bushing is disposed adjacent to the rear end of an extension housing of the automotive transmission for rotatably supporting an output shaft or sleeve which is rotatable in unison with said output shaft,

said device comprising:

means defining a plurality of oil grooves in the bore of said

rear bushing in such a pattern that upon rotation of said output shaft or sleeve in the direction corresponding to forward gears, lubricating oil is drawn into said oil grooves from the front and rear ends of said rear bushing to be distributed over the whole inner surface of said



rear bushing and to be discharged only in the rear space behind said rear bushing, and

means defining at least one axial passage in a portion of said extension housing surrounding the upper portion of the rear bushing for intercommunicating said rear space and said front space.

4,090,749

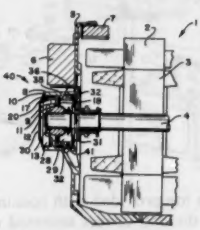
TWIST LOCK SELF-ALIGNING BEARING SYSTEM

Nicholas R. Daniels, St. Louis, Mo., assignor to Emerson Electric Co., St. Louis, Mo.

Filed Dec. 6, 1976, Ser. No. 747,867

Int. Cl.[2] F16C *33/66, 23/00*

U.S. Cl. 308—132 **10 Claims**



1. A twist lock, self-aligning bearing assembly, comprising:

a hub, said hub having an axial opening in it defined by a first wall, said hub having a second wall spaced from and outboard of said first wall;

bearing means mounted in the axial opening;

wick means for providing lubrication to said bearing means positioned about said bearing means, said wick means having a part extending between said first wall and said second wall and directed axially outwardly of said hub;

receptacle means formed along said second wall, said receptacle means extending radially inwardly of said hub, said receptacle means including an abutment surface spaced axially from said first wall, and an open mouth channel having at least one closed side, said abutment surface bounding a portion of said channel; and

retainer means having a central portion, an aperture in said central portion defined by an annular seat in engagement with said bearing means, said retainer means defining tabs on the outer boundary thereof, said tabs being sized for reception in the channel of said receptacle means and being insertable therein by rotational movement of said retainer means, said retainer means being deflected for insertion in said channel along said tabs, said tabs being held against said abutment surface in stress condition, said retainer being rotatable in the channel of said receptacle means until said tabs meet the closed side of said channel.

4,090,750

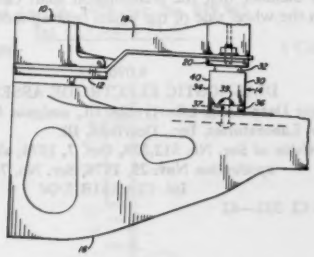
RESILIENT RAILWAY TRUCK SIDE BEARING

Donald Wiebe, Sewickley, Pa., assignor to A. Stucki Company, Pittsburgh, Pa.

Filed Mar. 4, 1977, Ser. No. 774,373

Int. Cl.[2] B61F *5/14, 5/24;* F16C *17/04, 27/02*

U.S. Cl. 308—138 **7 Claims**



1. A railway vehicle side bearing assembly adapted to be disposed intermediate a bolster and car body of a railway vehicle comprising: a generally horizontally elongated main body member: a plurality of generally vertically extending upwardly open longitudinally spaced retaining means formed within said body member; elastomeric bearing means received within each of said retaining means; each of said bearing means having a generally horizontally extending planer uppermost surface which is adapted to engage a respective generally planer horizontally extending surface of such a car body for the control of railway vehicle hunting by frictional restraint; said uppermost surface of said bearing means being vertically spaced upwardly from the uppermost surface of said body member when said bearing means are in the natural relaxed state thereof and when first vertical loadings are directed to such a side bearing; and each of said retaining means having a pair of longitudinally spaced immovable rigid abutment surfaces adapted to engage adjacent portions of the respective bearing means received therewithin downwardly adjacent the upper surface of said body member.

4,090,751

WHEEL BEARING ASSEMBLY FOR A WHEEL HUB OF A MOTOR VEHICLE

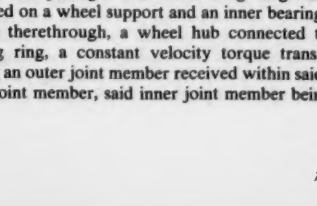
Werner Krude, Neunkirchen, Germany, assignor to Uni-Cardan AG, Lohmar, Germany

Filed Dec. 13, 1976, Ser. No. 750,169

Claims priority, application Germany, Dec. 13, 1975, 2556177

Int. Cl.[2] F16C *13/02*

U.S. Cl. 308—191 **13 Claims**



1. A wheel bearing assembly for a wheel hub of a motor vehicle comprising an outer bearing ring adapted to be mounted on a wheel support and an inner bearing ring having a bore therethrough, a wheel hub connected to said inner bearing ring, a constant velocity torque transmitting joint having an outer joint member received within said bore and an inner joint member, said inner joint member being connected

to a transmission shaft, means on said wheel hub engaging said inner bearing ring for centering said wheel hub within said bore of said inner bearing ring, means for nonrotatably connecting said wheel hub and said outer joint member, and means for positioning rotatably said outer joint member within said bore against axial movement with respect to said inner bearing ring, the opening of said bore directed toward the wheel hub being of such size with respect to the outer surface of said outer joint member that the transmission shaft can be withdrawn from the wheel side of the wheel bearing mount.

4,090,752

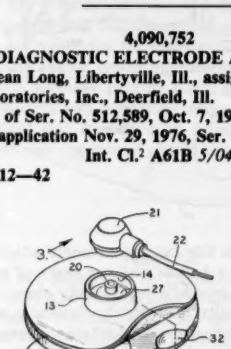
DIAGNOSTIC ELECTRODE ASSEMBLY

Gregor Dean Long, Libertyville, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Division of Ser. No. 512,589, Oct. 7, 1974, abandoned. This application Nov. 29, 1976, Ser. No. 745,684

Int. Cl.[2] A61B *5/04*

U.S. Cl. 312—42 **7 Claims**



1. A dispenser for dispensing disposable body electrode assemblies of the type having disc-shaped base and cover members joined during storage by an interposed layer of adhesive and forming a relatively thin stiff peelably separable assembly, said dispenser comprising, in combination:

a housing forming an elongated chamber for receiving a plurality of said electrode assemblies in stacked relationship, said chamber having a uniform inside cross-section along its length complementary to the outside dimension of said electrode assemblies;

mounting means for supporting said housing in a substantially vertical upstanding relationship whereby said electrode assemblies are contained in said chamber in a substantially vertical stacked relationship;

means comprising a dispensing station at the bottom end of said housing for enabling a user to remove said body electrodes one at a time from said chamber;

said dispensing station includes a bottom passageway to pass a single one of said disc-shaped body electrodes at one time; and

said passageway is closed throughout opposing peripheral extents thereof.

4,090,753

FASTENING DEVICE

Erich Rock, Hochst, and Bernhard Mages, Dornbirn, both of Austria, assignors to Julius Blum Gesellschaft m.b.H., Hochst, Austria

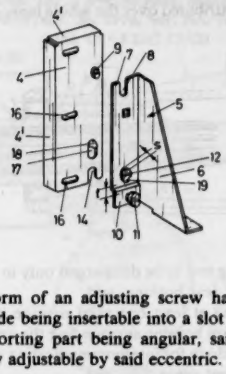
Filed Jun. 30, 1976, Ser. No. 701,752

Claims priority, application Austria, Jul. 3, 1975, 5152/75

Int. Cl.[2] F16B *12/00*

U.S. Cl. 312—140 **7 Claims**

7. A fastening device (3) for an adjustable front panel (14) of pull-out furniture parts, particularly for drawers (1) having guide rails (2), comprising for each guide rail a supporting part (5) with a fastening leaf (7) for cooperation with a retaining part (4) secured to the front panel, said retaining part being adjustably located on said supporting part at least with respect to height, and being fixable in position by means of fastening screws (11), and an eccentric (12) located in said fastening leaf, which cooperates with a stop (18) in said retaining part, said fastening leaf having a bent portion, the protrusion of which corresponds to the thickness of said eccentric, said bent portion being a separate intermediate piece mounted on said fastening leaf for sideways movement, and element for angular adjustment in the form of an adjusting screw having an annular guide, said guide being insertable into a slot in said fastening leaf, said supporting part being angular, said retaining part being angularly adjustable by said eccentric.



4,090,754

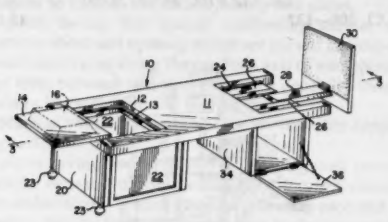
THEATER CABINET TABLE

George Kavis, 355 E. 146th St., Harvey, Ill. 60426

Filed Feb. 9, 1977, Ser. No. 766,960

Int. Cl.[2] A47B *47/00*

U.S. Cl. 312—196 **1 Claim**



1. A table having a top provided with openings in diametrically opposite sides thereof, covers mounted on said top to open or close said openings, a photographic projector removably mounted on the under side of one of said covers, and a photographic screen surface on the under side of the other cover, a support plate, secured to the under side of the table top, and spanning the opening for said other cover, a slide bar slidably mounted on the support plate, said other cover being hingedly mounted on the end of said slide bar and movable to a position vertical thereto, and catches on the slide bar engageable with catches on said other cover when in vertical position to hold said other cover in that position as long as desired.

4,090,755

CABINET ASSEMBLY

Frank S. Johnson, Chicago, Ill., assignor to Marvel Metal Products Company, Chicago, Ill.

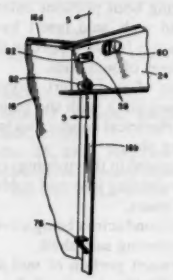
Filed Jan. 3, 1977, Ser. No. 756,374

Int. Cl.[2] A47B *43/00, 48/00;* A47F *3/00;* F16B *12/00*

U.S. Cl. 312—257 R **2 Claims**

1. A knockdown cabinet comprising a base member, a top member, a pair of side panel members, a rear panel member, a front crosspiece and a rear crosspiece, said base member having a top wall and depending front and rear walls, the top wall of the base member having spaced, pin-receiving openings therethrough along the rear margin thereof, the depending front and rear walls of the base member each having screw-receiving openings therethrough at the ends thereof, each of said screw-receiving openings having a threaded, nut-like element permanently secured in register therewith on the inner

surface of the depending front and rear walls of the base member, said side panel members each having inwardly extending front, rear and top flanges, each of the front and rear flanges having screw-receiving openings therethrough at the upper and lower ends thereof, and the top flange having screw-receiving openings therethrough at the front and rear ends thereof, the openings at the lower end of the front and rear flanges of the side panel members being in register with the screw-receiving openings in the depending front and rear walls of the base member and being adapted to receive a screw for securing the lower end of the front and rear flanges of the side panel members to the front and rear walls of the base member through the threaded, nut-like elements on the inner surface of said front and rear walls of the base member, said front and rear crosspieces each having screw-receiving openings therethrough at the ends thereof, each of the openings at the ends of the crosspieces having a threaded, nut-like element permanently secured in register therewith on the inner surface of each of the crosspieces, the screw-receiving openings at the ends of the crosspieces being in register with the screw-receiving openings at the upper end of each of the inwardly extending front and rear flanges of the side panel members and being adapted to receive a screw for securing the upper end of the front and rear flanges of the side panel members to the crosspieces through the threaded, nut-like elements on the inner surface of each of the crosspieces, said top member having a top wall and depending front, rear and side walls, the base of each of the side walls of the top member having screw-receiving openings therethrough, each of the openings in the base of the side walls of the top member having a threaded, nut-like element permanently secured in register therewith inwardly of the base of the side walls of the top member, the screw-receiving openings in the base of the side walls of the top member being in register with the screw-receiving openings in the inwardly extending top flange of each of the side panel members and being adapted to receive a screw for securing the base of the side walls of the top member to the top flange of the side panel members through said threaded, nut-like elements secured inwardly of the base of each of the side walls of the top member, said rear panel member having a pair of spaced pins mounted on the inner surface thereof inwardly of the lower margin of the rear panel member, said pins being adapted to be received in the spaced, pin-receiving openings at the rear margin of the top wall of the base member, said rear panel member further having rear crosspiece engaging fastening means mounted in spaced relation on the inner surface at the upper margin thereof, said pins when engaged in the pin-receiving openings in the top wall of the base member cooperating with the crosspiece engaging fastening means on the inner surface of the rear panel member to enable the rear panel member to be securely fastened in position in abutting relation to the rear crosspiece of the cabinet, said rear crosspiece is provided with fastening clips, and the rear cross-piece engaging fastening means at the upper margin of the rear panel member comprise means which are engaged in the fastening clips on the rear crosspiece, said inwardly extending front and rear flanges of the side panel members are provided with openings for receiving shelf supporting brackets whereby a shelf can be supported within the cabinet.

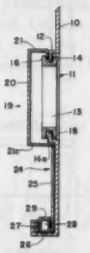


4,090,756

RECESSED PULL FOR MOVABLE PANELS

Frederick J. Frey, Michigan City, Ind., and William F. Chandler, Jamestown, N.Y., assignors to InterRoyal Corporation, New York, N.Y.

Filed Apr. 26, 1976, Ser. No. 679,965
Int. Cl.[2] A47B *95/02*
U.S. Cl. 312—320 **5 Claims**



1. A pull for a movable panel having an aperture comprising:

a unitary trim piece for surrounding said aperture having grooves along its upper and lower edges adapted to accommodate the upper and lower edges of the panel around the aperture,

yielding edge means intermediately disposed integrally on the trim piece and comprising an intermediately extending beveled portion along at least one of the said edges of the trim piece and defining the corresponding portion of the groove thereat for enabling the trim piece to be deformed locally thereat in a direction substantially crosswise of the normal plane of said beveled portion under pressure laterally thereagainst and to return to its original shape upon the release of said pressure whereby the trim piece may be pressed thereat against an adjacent edge portion of the panel around the aperture and into self-supporting position into the aperture with the upper and lower edges of the panel around the aperture accommodated in the grooves along the upper and lower edges of the trim piece upon the release of said pressure and return of the trim piece to its original shape for snap-locking the unitary trim piece into the panel aperture, a cover member having rear, top and bottom walls and a flange downwardly extending from one top wall of the cover member engageable in the groove along the upper edge of the trim piece, and

weight means for exerting downward pressure on the flange of the coven member to maintain said flange in said groove in the trim piece to inhibit inadvertent disengagement of the cover member from the trim piece.

4,090,757

RECESSED PULL FOR DRAWERS OR THE LIKE

Frederick J. Frey, and Daniel S. Kaminski, both of Michigan City, Ind., assignors to InterRoyal Corporation, New York, N.Y.

Filed Apr. 26, 1976, Ser. No. 679,966
Int. Cl.[2] A47B *95/02*
U.S. Cl. 312—320 **4 Claims**

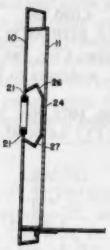
1. A drawer or the like comprising:

a spaced apart inner front panel and outer front panel together forming the front vertical wall of the drawer,

said outer front panel having an aperture intermediate its edges; a trim piece surrounding said aperture; and

a cover member fixedly secured to the front surface of said inner front panel and disposed in the space between said

inner front panel and said outer front panel rearwardly of the aperture in said outer front panel and vertically remote



from the margins of such aperture to form a recessed pull for said drawer.

4,090,758

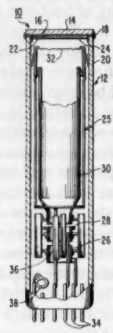
METHOD OF REGENERATING A LEAD MONOXIDE TARGET LAYER OF A CAMERA TUBE

Chih Chun Wang, Hightstown; Thomas Clifford Lausman, Cranbury, and Ronald Frank Bates, Trenton, all of N.J., assignors to RCA Corporation, New York, N.Y.

Division of Ser. No. 663,624, Mar. 3, 1976, abandoned. This application Jan. 21, 1977, Ser. No. 761,447

Int. Cl.[2] H01J *9/50*

U.S. Cl. 316—2 **1 Claim**



1. A method of regenerating a camera tube which comprises:

a. providing a camera tube, comprising:

1. an evacuated envelope;

2. a radiation sensitive photoconductive layer comprising primarily lead monoxide within said envelope, said layer, after a period of storage or operation, exhibiting degeneration of the characteristic ratio of the spectral photosensitivity of the layer, the characteristic ratio being determined by the ratio of the layer photosensitivity at a given layer operating voltage to the layer photosensitivity at a reference voltage;

3. at least one activated getter within said envelope; and

4. at least one unactivated getter within said envelope capable of activation after said period of operation or storage;

b. measuring said characteristic ratio after said period of operation or storage to determine the level of spectral photosensitivity of said layer; and

c. activating said unactivated getter when the characteristic ratio of blue light photosensitivity is less than about 80%.

4,090,759

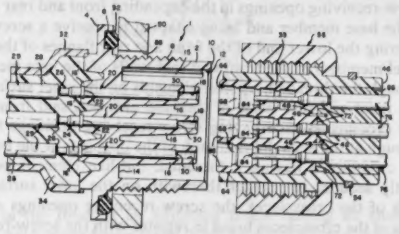
MICRO-MINIATURE CIRCULAR HIGH VOLTAGE CONNECTOR

Henry Otto Herrmann, Jr., Mt. Joy, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Apr. 17, 1975, Ser. No. 569,025

Int. Cl.[2] H01R *13/52*

U.S. Cl. 339—60 M **6 Claims**



1. A high voltage connector, comprising:

a plug,

a receptacle,

said plug having an outer rigid dielectric shell having a central web provided with apertures therethrough,

a compressible dielectric insert within a forward portion of said plug and seated against said web, said insert having integral projecting boot portions entering corresponding apertures in said web, said insert having a plurality of tapered recesses in a forward portion thereof in alignment with said apertures of said web,

said boot portions of said insert having openings therethrough communicating with the recesses in said insert,

a plurality of first electrical conductors terminated to electrically conducting pins,

said pins being received in the openings of said boot portions and said pins projecting into said recesses in said forward portion of said insert,

said first electrical conductors being covered with first insulation sheaths entering said shell,

means in the rearward portion of said shell encircling said first insulation sheaths,

said receptacle having an outer rigid dielectric shell matably receiving said plug shell,

said receptacle shell having an inner wall provided with a plurality of dielectric sleeves projecting toward a forward portion of said receptacle shell for mating receipt in said recesses of said insert,

said sleeves having cavities extending therethrough,

electrically conducting sockets retained in said cavities and matingly receiving said pins,

second electrical conductors terminated to said sockets,

second insulation sheaths covering said second electrical conductors,

means in a rearward portion of said receptacle shell encircling said second insulation sheaths, and

said insert protruding from a forward end of said plug shell and is compressed by said receptacle upon mating engagement of said plug shell and said receptacle shell.

4,090,760

ELECTRICAL CONNECTION SYSTEM

Robert J. Furey, Valdosta, Ga., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Filed Oct. 5, 1976, Ser. No. 729,820

Int. Cl.[2] H01R *13/62;* **A61N** *1/04*

U.S. Cl. 339—61 R **4 Claims**

1. An electrical connector system comprising:

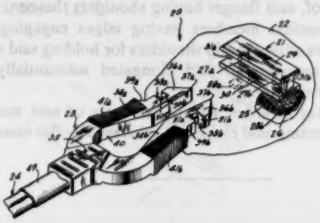
a. a contact member having a tunnel portion and spaced, vertical contact pillars secured within the tunnel portion;

b. a cable connector latchably engageable to said contact

pillars, and having an encasement formed of resilient arm members joined at a base portion;

c. a frontal portion at the end of each arm member;

d. a notch means rearward of the frontal portion for latching to each of the contact pillars but not other portions of the contact member;



e. a contact strip positioned within each arm member, a portion of said strip being positioned in and exposed in said notch means adjacent a bottom portion thereof; and

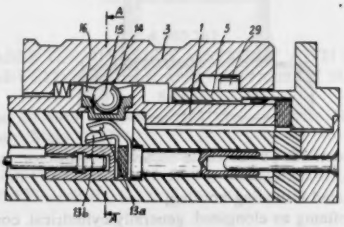
f. the tunnel portion being formed by spaced apart, planar top and bottom members with end-support pillars therebetween, each support pillar being adjacent a contact pillar and spaced therefrom, a side width of each of said pillars being less than the length of the tunnel.

4,090,761

CONNECTOR WITH REMOTE CONTROL LOCKING SYSTEM

Pierre Souville, Boulogne-Billancourt, and Jean-Pierre Baudouin, Evreux, both of France, assignors to Compagnie Deutsch, Saint-Cloud, France

Filed Mar. 25, 1977, Ser. No. 781,356
Claims priority, application France, Mar. 26, 1976, 76 08822
Int. Cl.[2] H01R *13/54*
U.S. Cl. 339—90 R **6 Claims**



1. An electric connector comprising first and second interfitting sections, each section carrying at least one electrical contact means for connection to a contact means in the other section,

locking means for coupling said first and second sections, said locking means including means for establishing a stable locking position for said sections and a stable unlocking position with positions of instability separating said locking and unlocking positions,

auxiliary electrical contact means carried by one of said sections and having a spring contact member which is movable to control said contact means between open and closed positions,

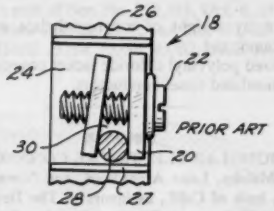
means for moving said movable member to one of said open and closed positions when said locking means is in the stable locking position and to the other of said positions when said locking means is in the stable unlocking position, said moving means comprising a bore formed in one of said connector sections, a ball movable in said bore for engaging said movable spring contact member, insulating means between said ball and said spring contact member and a ramp formed on said locking member for engaging said ball to move the ball inwardly and outwardly of the section as the locking ring is moved from one stable position to the other, said spring contact member urging said ball towards said ramp.

4,090,762

ELECTRICAL TERMINAL CONNECTION AND METHOD OF MAKING SAME

Ernest Gerhard Hoffman, Middlefield, Conn., assignor to Harvey Hubbell, Incorporated, Orange, Conn.

Filed Jan. 18, 1977, Ser. No. 760,309
Int. Cl.[2] H01R *11/20*
U.S. Cl. 339—95 R **9 Claims**



9. A conductor connecting terminal assembly comprising, a terminal element, a clamp element in opposed relation to the terminal element, screw means for moving the clamp element toward the terminal element to clamp a conductor between said elements, a unitary tab on one of said elements, said tab originating at a body portion of said one element and extending toward the other element, surface means on one of said elements for camming a conductor positioned between said terminal element and clamp element toward said screw means in response to movement of the clamp element toward the terminal element, said surface means comprising an inside surface of said tab which extends at an acute angle with respect to the line of action of said screw means, said screw means projecting through a clearance opening in one of the elements and being threaded into an opening in the other of the elements, one of the elements comprising a pair of spaced apart fingers bent to extend at an acute angle to the line of action of the screw means and defining a slot therebetween extending to the opening through which the screw means extends, said tab having an inside surface extending at an acute angle to said screw means and extending between said fingers, said screw means moving said clamp element with respect to said terminal element in said direction to a clamped position in which the conductor is cammed toward said screw means and tightly clamped between the clamp element and the terminal element.

4,090,763

CORDAGE FOR USE IN TELECOMMUNICATIONS

Wayne Irving Congdon, Indianapolis, Ind.; John Joseph Mottine, Red Bank, N.J., and William Charles Vesperman, Baltimore, Md., assignors to Bell Telephone Laboratories Incorporated, New York, N.Y. and Bell Telephone Laboratories, Murray Hill, N.J.

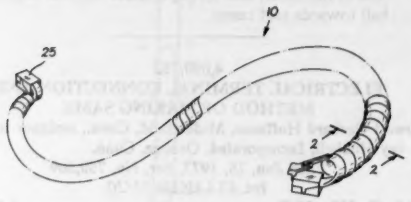
Filed Apr. 22, 1976, Ser. No. 679,282
Int. Cl.[2] H01R *13/58*
U.S. Cl. 339—103 M **15 Claims**

1. A cord, comprising:

a plurality of individually insulated tinsel conductors each having a polymeric core and a plurality of electrically conductive, flexible tinsel ribbons wrapped spirally about the core;

an insulation cover encompassing each individual tinsel conductor, which is obtained by reacting 1, 4 butane diol terephthalate with terephthalate esters of polytetrameth-

ylene glycol and which comprises approximately 15.7 percent by weight of polytetramethylene glycol having a number average molecular weight of about 1,000, about 32.4 percent by weight of 1, 4 butane diol, and about 50.7



percent by weight of a terephthalate ester-containing compound; and

a plasticized polyvinyl chloride jacket covering the individually insulated tinsel conductors.

4,090,764

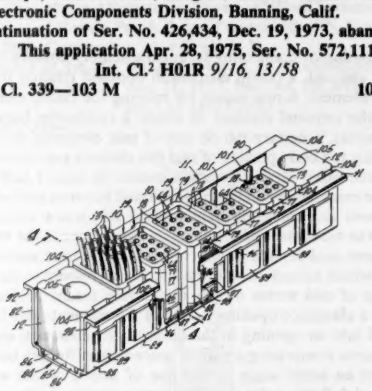
MODULAR ELECTRICAL CONNECTOR

Marc W. Malsby, Lake Arrowhead, and Norman W. Willey, Yucaipa, both of Calif., assignors to The Deutsch Company Electronic Components Division, Banning, Calif.

Continuation of Ser. No. 426,434, Dec. 19, 1973, abandoned. This application Apr. 28, 1975, Ser. No. 572,111

Int. Cl.[2] H01R *9/16, 13/58*

U.S. Cl. 339—103 M **10 Claims**



1. An electrical connector arrangement comprising

a plurality of modules,

and a support for said modules,

each of said modules including a body of dielectric material,

said body having a plurality of openings therein,

an electrical circuit means in each of said openings including

a duality of socket contacts in each of said openings,

a wire connected to each of said socket contacts, and a pin contact in each of said openings having opposite ends received in said socket contacts for forming an electrical connection therebetween,

said support including a duality of elongated substantially flat members defining opposed spaced walls,

said modules being positioned between said walls in a side-by-side relationship so as to form a row of said modules, and having opposite outer surfaces adjacent said walls,

each of said surfaces having a duality of abutments,

said support including

at least four resilient opposed retention members for each of said modules,

each of said retention members being inclined inwardly toward an adjacent module and having an outer end engaging one of said abutments thereof for retaining said modules to said support,

two of said retention members being inclined inwardly in one direction for engaging two of said abutments, two of said retention members being inclined inwardly in the opposite direction for engaging the other two of said abutments.

each of said elongated substantially flat members having an outwardly projecting flange along either side edge thereof, said flanges having shoulders thereon,

said retention members having edges engaging said flanges adjacent said shoulders for holding said retention members to said elongated substantially flat members,

and a member at either end of said row of said modules interconnecting said elongated substantially flat members.

4,090,765

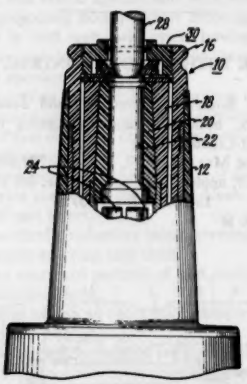
ELECTRIC CABLE SEPARABLE CONNECTOR MODULE HAVING A SLIDING SEGMENT GATE GAS-TRAP VALVE

Vincent J. Boliver, Hackettstown, N.J., and James E. Belcher, Dalton, Mass., assignors to General Electric Company, Philadelphia, Pa.

Filed Jul. 13, 1977, Ser. No. 815,183

Int. Cl.[2] H01R *13/52*

U.S. Cl. 339—111 **5 Claims**



1. An electrical power cable separable connector module comprising:

an elongated insulating housing;

means defining an elongated, generally cylindrical, contact-receiving bore that extends from a first end of said housing a predetermined distance into said housing;

a bore contact mounted in said housing in communication with the inner end of said bore, said bore contact being adapted to receive a rod contact member of a matching connector module when the rod contact is inserted into said bore;

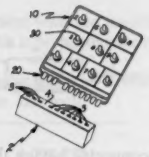
a gas-trap valve mounted adjacent the outermost end of said bore, said valve being operable to move rapidly into a closed position thereby to effectively seal the outer end of said bore and trap arc-generated gases therein, responsive to the rod contact being moved outward in said bore beyond said valve, and being further operable to permit entry of said rod contact into said bore when said valve is moved to its open position, the ionized gases being directed against said second contact until they are trapped within said bore by said valve being moved to its closed position,

wherein the improvement comprises that said gas trap valve is a segmented sliding gate valve.

4,090,766
TEST CONNECTOR ADAPTOR

George A. Buhr; Joseph J. Borowicz, and Donald C. McKinnon, all of Cheboygan, Mich., assignors to Fox Valley Instrument Company, Cheboygan, Mich.

Filed Jul. 5, 1977, Ser. No. 812,499
Int. Cl.[2] H01R 3/00
U.S. Cl. 339—113 L 11 Claims



10. A connector adaptor for electrical interconnection with a diagnostic connector in an automobile, said adaptor comprising:

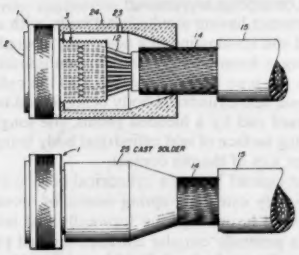
a series of generally L-shaped, conductive strips formed from generally flat stock, each such strip having a leg section and a terminal section generally perpendicular thereto, the leg sections of at least some of said strips being of differing lengths; and

an insulative encasement for said strips, said encasement encasing and rigidifying said strips with the leg sections thereof generally parallel to and relatively closely spaced from one another, the terminal sections extending outwardly through said encasement and protruding from the face thereof whereby electrical connection may be made thereto and the extremities of the legs sections protruding from one side of said encasement an approximate equal distance for conductive engagement with said connector, adjacent strips having leg sections of differing lengths to space said protruding terminal sections from one another on the face of said encasement.

4,090,767
CABLE TERMINATION ASSEMBLY WITH CAST CONDUCTIVE SHIELD AND METHOD OF MAKING SAME

William Leonard Tregoning, 185 Quincy Shore Dr., North Quincy, Mass. 02171

Filed Oct. 6, 1976, Ser. No. 730,215
Int. Cl.[2] H01R 13/34, 13/36, 43/02; B22D 19/00
U.S. Cl. 339—143 R 3 Claims



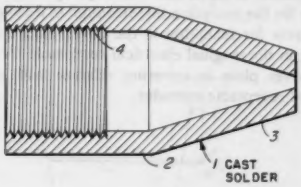
1. That method of manufacturing a cable termination for a cable having a first shield and having a number of conductors, which number is at least one which method comprises connecting said number of conductors to a connector plug having a second shield so as to form a cable-plug assembly, placing said assembly in a mold which extends over both shields, filling said mold with cast metallic conductive material, and removing said mold.

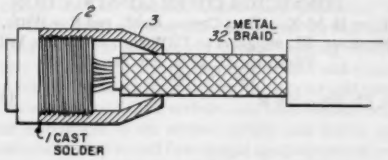
2. A termination assembly for a cable comprising, in combination with a cable having an overall cable shield and having a number of conductors, which number is at least one, a connector plug havng a shield and being connected to said number of conductors of said cable so that said shield is longitudinally spaced from said overall cable shield by an intershield gap, and cast metallic rigid conductive material engaging both of said shields and surrounding and filling the intershield gap.

4,090,768
ADAPTOR BACK-SHELL FOR CABLE-ASSEMBLY JUNCTIONS

William Leonard Tregoning, 185 Quincy Shore Dr., North Quincy, Mass. 02171

Continuation-in-part of Ser. No. 730,215, Oct. 6, 1976. This application Jan. 21, 1977, Ser. No. 761,405
Int. Cl.[2] H01R 13/34, 13/36, 43/02; B23K 35/14
U.S. Cl. 339—143 R 4 Claims



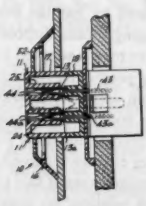


1. Adapter back-shell for cable-assembly junctions comprising a unitary tubular member having an internally threaded cylindrical portion and a substantially conical portion joined directly to said cylindrical portion and tapering from said cylindrical portion to a small-diameter end, said unitary member consisting entirely of cast solder, the diameter of said small diameter end being substantially less than that of said cylindrical portion as a result of said taper.

4,090,769
PLUG-IN ELECTRICAL RECEPTACLE EXTENDER

Arnold Damsky, 821 83rd St., Miami Beach, Fla. 33141

Filed May 20, 1977, Ser. No. 798,771
Int. Cl.[2] H01R 13/46, 27/00
U.S. Cl. 339—156 R 4 Claims



1. In a plug-in electrical receptacle extender for use in associ-

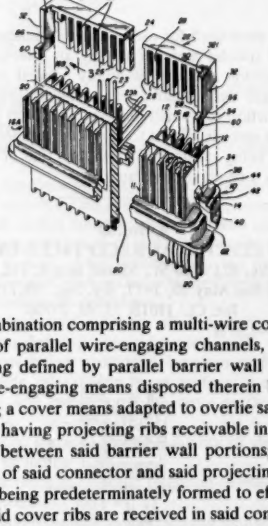
ation with an existing electrical receptacle having an outwardly projecting electrically insulating housing, a plurality of contact prong receiving openings in the front surface of the housing, and a beveled edge cover plate of electrically insulating material having a through opening complemental in peripheral shape with the peripheral shape of the receptacle housing projection, the improvement comprising an electrically insulating housing member having separable inner and outer shell portions, said outer shell portion having an outwardly projecting portion providing, in the face thereof, a plurality of contact-prong-receiving openings having the same relative disposition as the contact prong openings in the original electrical receptacle, a plurality of electrical plug contactors behind said contact-prong-receiving openings in said outer shell and projecting inwardly of said inner shell portion thereof for plug-in reception in the original electrical receptacle, the peripheral shape of said outwardly-projection portion of said outer shell portion being the same as that of the original electrical receptacle to permit interfitting use therewith of an outer cover plate of the same size and shape as the original electrical receptacle cover plate, and a through opening in said housing member for the reception therethrough of a cover plate attachment screw for reception in the cover plate screw receiving opening in the original electrical receptacle for retaining said outer cover plate in covering relation with respect to the electrical receptacle extender.

4,090,770

CONNECTOR COVER CONSTRUCTION

William H. McKee, West Covina, Calif., and Roy Witte, Rolling Meadows, Ill., assignors to TRW Inc., Elk Grove Village, Ill.

Filed Sep. 27, 1976, Ser. No. 727,010
Int. Cl.[2] H01R *13/46*
U.S. Cl. 339—206 R **13 Claims**



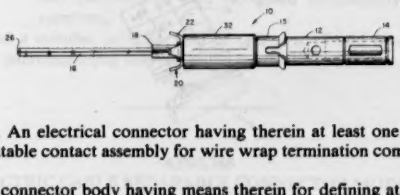
1. The combination comprising a multi-wire connector having a series of parallel wire-engaging channels, each of said channels being defined by parallel barrier wall portions and having a wire-engaging means disposed therein between said wall portions; a cover means adapted to overlie said connector channels and having projecting ribs receivable in said connector channels between said barrier wall portions; said barrier wall portions of said connector and said projecting ribs of said cover means being predeterminately formed to effect an interlock when said cover ribs are received in said connector channels with the longitudinal axes of said cover ribs and connector channels in parallel relation, to prevent disengagement between said ribs and channels other than by relative slidable movement parallel to said rib and channel longitudinal axes.

4,090,771

CONTACT ASSEMBLY WITH ROTATIONAL LOCK FOR WIRE WRAP TERMINATION

Norbert L. Moulin, Placentia, Calif., assignor to Hughes Aircraft Company, Culver City, Calif. 90230

Continuation of Ser. No. 597,253, Jul. 18, 1975, abandoned. This application Sep. 15, 1976, Ser. No. 723,357
Int. Cl.[2] H01R *13/40*
U.S. Cl. 339—217 S **9 Claims**



1. An electrical connector having therein at least one non-rotatable contact assembly for wire wrap termination comprising:

a connector body having means therein for defining at least one contact-receiving cavity;

at least one electrical contact positioned in said cavity means;

a retention clip rotatably mounted on said contact and axially retaining said contact in said cavity means;

a post extending from one end of said contact for enabling a conductor to be wrapped and electrically coupled to and around said post; and

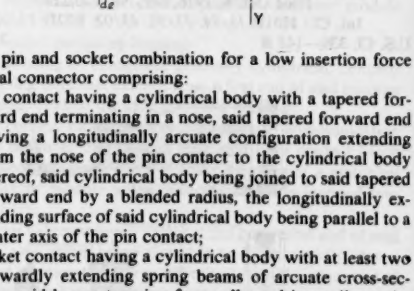
means otherwise independent from said axial retaining means secured to said contact means, engaged with a wall of said contact-receiving cavity means and resisting rotation of said contact with respect to said cavity means when the conductor is wrapped and electrically coupled to and around said post.

4,090,772

LOW INSERTION FORCE ELECTRICAL CONNECTOR

David Samuel Goodman, Mission Viejo, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Jan. 24, 1977, Ser. No. 761,854
Int. Cl.[2] H01R *13/54*
U.S. Cl. 339—258 R **12 Claims**



1. A pin and socket combination for a low insertion force electrical connector comprising:

a pin contact having a cylindrical body with a tapered forward end terminating in a nose, said tapered forward end having a longitudinally arcuate configuration extending from the nose of the pin contact to the cylindrical body thereof, said cylindrical body being joined to said tapered forward end by a blended radius, the longitudinally extending surface of said cylindrical body being parallel to a center axis of the pin contact;

a socket contact having a cylindrical body with at least two forwardly extending spring beams of arcuate cross-section, said beams tapering forwardly and inwardly to define a generally circular entrance for said pin contact;

the inner forward edges of said beams at said entrance being tapered and joined to the inner surfaces of said beams by blended radii;

the ratio of the length of each said beam to the outside diameter of said socket contact cylindrical body being between 2 and 5;

the ratio of the diameter of said circular entrance of said socket contact to the diameter of said pin contact cylindri-

cal body being at least 0.7 when said pin contact is removed from said socket contact;

said tapered forward end of said pin contact having a shape bounded by surfaces of revolution generated about the X axis by the equations:

$$X^2 + 0.690X + 27.563\ Y^2 - 27.444 = 0 \text{ and}$$

$$X^2 + 0.690X + 22.563\ Y^2 - 22.444 = 0$$

where the X axis coincides with the longitudinal axis of said pin contact and the Y axis is perpendicular to said longitudinal axis; and

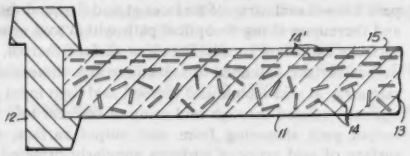
the engaging surface of at least one of said contacts having a finish smoother than 32μ inch.

4,090,773

INFRARED-REFLECTING GLAZING

Peter Bauer, Darmstadt; Udo Fischer, Bickenbach, and Ludwig Hosch, Darmstadt, all of Germany, assignors to Rohm GmbH, Darmstadt, Germany

Filed Sep. 21, 1976, Ser. No. 725,188
Claims priority, application Germany, Oct. 3, 1975, 2544245
Int. Cl.[2] G02B 5/26
U.S. Cl. 350—1.6 **3 Claims**



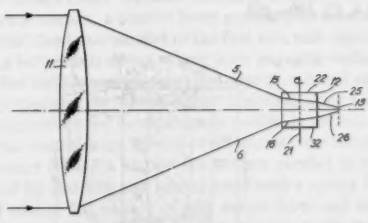
1. In the method of reducing the penetration of infra-red radiation into buildings or vehicles with glazing which is transparent to visible light but infra-red reflecting, the improvement wherein said buildings or vehicles are glazed with polymethylmethacrylate sheet comprising plate-shaped particles of a light-reflecting pigment, said pigment having a thickness d and an index of refraction n, at a wavelength of infra-red light from 800 to 1500 nm, such that $d = (0.2 \text{ to } 0.4)(1/n)$ microns, said particles being at least in part arranged parallel to the surfaces of the sheet.

4,090,774

PRISM ARRANGEMENT FOR SCANNING INFRARED IMAGES

Günter Zeifang, Neckargemund, Germany, assignor to Eltro GmbH & Co., Heidelberg, Germany

Filed Aug. 5, 1968, Ser. No. 750,090
Claims priority, application Germany, Aug. 3, 1967, 1734521
Int. Cl.[2] G02B 27/17
U.S. Cl. 350—6.4 **8 Claims**



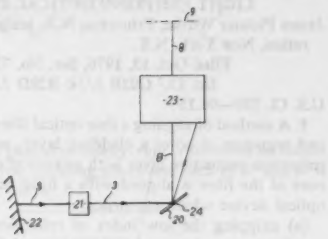
1. Apparatus for line scanning an image comprising means for producing a convergent beam path of a plurality of lines, an optical prism in said beam path for scanning and optical transmission of said lines to a series of spaced optically sensitive receiving elements, and means to rotate said prism on an axis parallel to said series to scan said lines, said prism having side faces through which the optical scanning and transmission is effected, which side faces are disposed at different angles relative to said axis such that by transition of said beam from one of said side faces to the next there is effected parallel shifting of the light rays through said faces from one line to another.

4,090,775

MOVEABLE OPTICAL PROBE FOR VIEWING A SCALE MODEL WITH IMAGE TILTING

Daniel Richard Lobb, 28 Darwin Close, Farnborough, Kent, England

Continuation-in-part of Ser. No. 483,386, Jun. 26, 1974, Pat. No. 3,972,584, which is a continuation of Ser. No. 286,969, Sep. 7, 1972, abandoned. This application Jul. 1, 1975, Ser. No. 592,354
Int. Cl.[2] G02B 17/00
U.S. Cl. 350—50 **10 Claims**



1. An optical arrangement comprising, in sequence, first and second optical imaging systems respectively positioned between first and second surfaces and said second surface and a third surface, the first and second optical imaging systems respectively defining first and second optical axes and respectively providing first and second images, the second said image being in-focus upon said third surface, said third surface being positioned orthogonal to the second optical axis and in spatially fixed relationship to said first optical imaging system, said optical arrangement further comprising an optical image-tilting device positioned between said first and said second optical imaging systems, and symmetrically distributed about said first image, said first optical imaging system being positioned for imaging said first surface to provide said first image thereof at said second surface, said first and second surfaces being both inclined to said first optical axis, and said second optical imaging system being positioned in relation to said optical image-tilting device for imaging a surface orthogonal to said second optical axis for forming said second image upon said third surface.

4,090,776

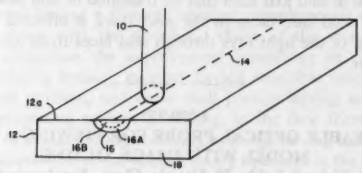
FABRICATION OF OPTICAL WAVEGUIDES

Enrique Bernal G.; Di Chen, both of Minnetonka; Barry G. Koepke, Mound, and James David Zook, Burnsville, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 13, 1976, Ser. No. 731,862
Int. Cl.[2] G02B 5/14
U.S. Cl. 350—96.12 **7 Claims**

1. A surface channel optical waveguide comprising: a body of glass material including a substrate region having a first index of refraction, second and third regions formed by laser beam exposure of a surface channel on said substrate, the upper surface of said second and third regions being substantially coplanar with a major surface of the material so that said second and third regions extend downwardly from said major surface, said second region being bordered by said substrate region and having its index of refraction substantially lowered from that of said substrate region, and said third region being

bordered by said second region and having an index of refraction higher than that of said second region whereby waveguiding occurs in said third region wherein said regions define a W-shape refractive index profile.



4,090,777

METHOD OF ALIGNING OPTICAL FIBERS WITH LIGHT EMITTING OPTICAL DEVICES

James Pleister Wittke, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 13, 1976, Ser. No. 732,069
Int. Cl.[2] G02B *5/14*; B29D *11/00*
U.S. Cl. 350—96.15 **7 Claims**

1. A method of aligning a thin optical fiber comprised of two end segments, a core, a cladding layer, and a low index of refraction protective layer with an optical device wherein the core of the fiber is aligned with a light emitting facet of the optical device which comprises:

(a) stripping the low index of refraction protective layer from an end segment of the optical fiber to expose the cladding layer of the optical fiber;

(b) applying a solution comprised of a volatile solvent and a polymer having an index of refraction greater than the cladding layer to the stripped end segment;

(c) evaporating the solvent to form a thin, continuous, high index of refraction layer on the segment; and

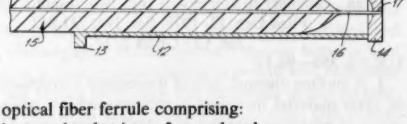
(d) positioning the high index of refraction coated segment in proximity to the light emitting facet of the optical device so that light emitted from the optical device exits the other end segment of the optical fiber whereby the core is aligned with the light emitting facet.

4,090,778

TERMINATING OPTICAL FIBERS AND OPTICAL FIBER CONNECTOR

Michael James Phillips, Stanstead, and John David Archer, Halifax, both of England, assignors to ITT Industries, Inc., New York, N.Y.

Filed Mar. 11, 1977, Ser. No. 776,596
Claims priority, application United Kingdom, Apr. 1, 1976, 13161/76
Int. Cl.[2] G02B *5/14*
U.S. Cl. 350—96.20 **10 Claims**



1. An optical fiber ferrule comprising:

a tubular member having a forward end;

a pierced watch bearing jewel mounted at the forward end of said tubular member having an aperture therein adapted to receive the end of an optical fiber mounted lengthwise in said member; and

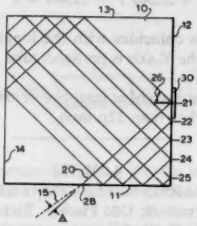
said jewel having an outer diameter greater than the cross-section of said tubular member at said forward end for directly using said jewel as alignment reference surfaces.

4,090,779

LIGHT BEAM POSITION CONTROL SYSTEM

Joseph T. McNaney, 8548 Boulder Dr., La Mesa, Calif. 92041

Filed Jan. 10, 1977, Ser. No. 758,301
Int. Cl.[2] G02F *1/16*
U.S. Cl. 350—355 **4 Claims**



1. In a light beam position control system:

(a) a source of light;

(b) an array of light reflecting surfaces, each surface presenting a length dimension, a width dimension, and first and second ends;

(c) means for directing light from said source along an input path toward said array of surfaces at said first end thereof and thereupon along an optical path within said array of surfaces extending to a light output surface thereof, said output surface extended along said width dimension of said array at said second end thereof, said light input path optically related through said array of surfaces to a light output path stemming from said output surface, each surface of said array of surfaces angularly oriented one with respect to the other for allowing light admitted to said array from said source to be reflected thereby along said optical path forming a helix of plural revolutions, said helix of plural revolutions extended in the direction of said length dimension from said first end to said output surface at said second end of said array of surfaces;

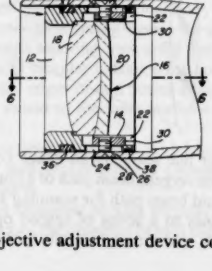
(d) means for directing light from said source along an optical path within said array of surfaces so as to allow said light to be reflected along said helix of plural revolutions toward said light output surface and allow said light to be incident upon a predetermined position along said dimension thereof across said second end of the array of surfaces.

4,090,780

LINEAR OBJECTIVE ADJUSTMENT DEVICE FOR RIFLE SCOPE COLLIMATION

Larry D. Davis, Denver, Colo., assignor to Outdoor Sports Inc., Denver, Colo.

Filed Nov. 16, 1976, Ser. No. 742,095
Int. Cl.[2] G02B *7/02*
U.S. Cl. 350—255 **8 Claims**



1. A linear objective adjustment device comprising:

an outer housing having an open end to receive an objective lens system;

a lens mount received within said open end of said housing and longitudinally slideable therein;

an objective lens system mounted within said lens mount;

means for adjustably locking said lens mount in fixed longitudinal position within the open end of said housing to adjust the back focal point of the objective lens system;

said lens mount includes a guideway having a slot through said lens mount extending longitudinally thereof, and a hole in the side of said outer housing aligned with said slot, said locking means including:

a slip nut in said guideway mounted for movement longitudinally along said slot; and a screw extending through said hole and threadably received in said slip nut to adjustably hold said lens mount in the fixed position in said open end of said outer housing.

4,090,781

MIRROR ORIENTING DEVICE FOR A LASER LEVELLING INSTRUMENT

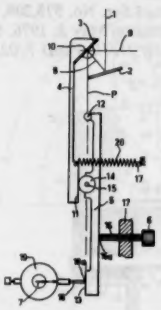
Jean Marie Godot, Brunoy, and Gerard Lafargue, Lile St. Denis, both of France, assignors to Essilor International Compagnie Generale d'Optique, Joinville le Pont, France

Filed Dec. 30, 1976, Ser. No. 755,573

Claims priority, application France, Feb. 16, 1976, 76 4142

Int. Cl.² G02B *25/00*

U.S. Cl. 350—285 **6 Claims**



1. A mirror-orienting device for a laser levelling instrument, said device comprising an optical deflecting system, a mirror mounted for rotation about a first fixed axis in the plane thereof, a mirror lever fixed to the mirror at one end thereof, a device for fine adjustment of rotational position of the mirror, a linear measurement indicator including an axially movable measuring contact, a control lever mounted for rotation about a second fixed axis parallel to the first axis, said control lever having between its ends a mirror lever engaging surface and a first flat surface remote from said second axis and said mirror lever engaging surface, said flat surface engaging with the measuring contact and being disposed parallel to the axis of rotation of the control lever, the end of the mirror lever remote from the mirror having a second flat surface parallel to the plane defined by said first and second axes, with a spring for urging said second flat surface of said mirror lever and said mirror lever engaging surface into mutual contact, the fine-adjustment device being mechanically coupled to one of said levers, said second axis being equidistant from said first axis and the region of contact of said mirror lever engaging surface with said second flat surface.

4,090,782

ELECTROCHROMIC DISPLAY DEVICES COMPRISING THIENYLIDENE PYRAZOLINE COMPOUNDS

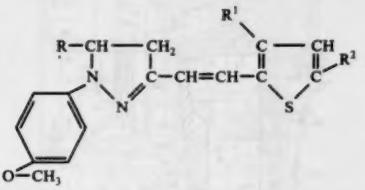
Karin Else Bredfeldt; Robert Bruce Champ, and Karl John Fowler, all of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 31, 1977, Ser. No. 801,946

Int. Cl.² G02F *1/17*; G09K *3/00*; G02F *1/20*; G02B *5/23*

U.S. Cl. 350—357 **6 Claims**

1. A reversible electrochromic display device comprising a reactive medium between two electrically conductive electrodes, at least one of which is transparent, said medium comprising an anhydrous solvent and an oxidant/reductant pair in which the reductant is an electron acceptor and the oxidant is a thienylidene pyrazoline compound having the formula



wherein R equals a phenyl or thienyl ring which may be substituted with an electron releasing group and each of R^1 and R^2 is hydrogen or lower alkyl.

4,090,783

PINCH ROLLER ACTUATING DEVICE

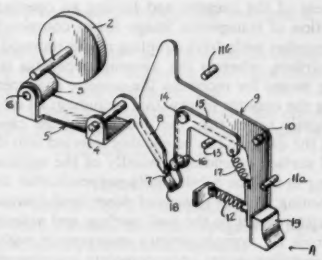
Yoshiaki Mizuki, Iruma, Japan, assignor to Nihon Beru-Haueru Kabushiki Kaisha (Bell & Howell Japan, Ltd.), Higashimurayama, Japan

Filed Sep. 20, 1976, Ser. No. 724,493

Claims priority, application Japan, Sep. 20, 1975, 50-113905

Int. Cl.² G03B *31/02*

U.S. Cl. 352—27 **5 Claims**



1. For a motion picture camera having a second station through which a sound film is transported between a capstan and a pinch roller when the camera is activated by an actuator member, an improvement in a pinch roller actuating mechanism comprising:

a pinch roller carrier pivoted about a fixed axis for movement of the pinch roller into and out of engagement with the capstan;

a connecting portion extending from said carrier;

a movable trigger member displaceable between a first position and a second position responsive to manual operation;

a blocking means extending from a portion of said trigger member;

limit means for stopping movement of said trigger member in said first and second positions;

a pinch roller carrier displacing member supported on said trigger member for engaging a portion of said carrier during movement of said trigger member toward said first

position and releasing said carrier during movement of said trigger member from said fist position

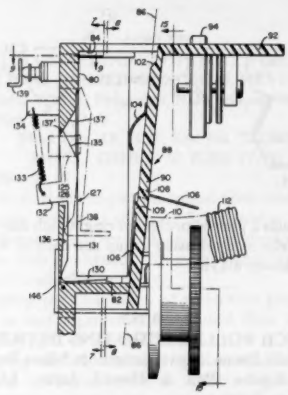
whereby said connecting portion of said carrier is displaced to a position wherein said blocking means of said trigger member precludes return of said connecting member from said second position to said first position.

4,090,784

APPARATUS FOR FACILITATING READY INSERTION AND REMOVAL OF CASSETTES FROM WELLS

David C. McElwaine, Newtonville, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Jan. 3, 1977, Ser. No. 756,432
Int. Cl.[2] G03B *23/02*
U.S. Cl. 352—74 **7 Claims**



1. In an apparatus for viewing by projection a photographic film strip contained within a substantially thin film cassette which has a pair of opposed major wall surfaces connected and spaced apart by a peripheral wall substantially defining the thickness of the cassette and having an opening therein for projection of transparent image forms contained on the film strip together with drive coupling means recessed in one major wall surface, wherein the viewing apparatus is of the type having means for receiving the cassette and operatively positioning the cassette therewithin including: an elongated opening slightly wider than the thickness of the cassette through which the cassette can be slidably inserted into the apparatus; a wall surface extending inwardly of the apparatus from the opening in a plane substantially perpendicular to the plane of the opening; at least one spool drive head journalled for rotation with respect to the wall surface and extending outward therefrom for complementary engagement with the cassette drive coupling means upon complete insertion of the cassette within the apparatus receiving means; means for engaging the other major surface of the cassette opposite from the drive coupling means as the cassette enters said apparatus and for resiliently urging the cassette towards the wall surface so that the major surface associated with the drive coupling means will ultimately nest against the wall surface with the spool drive head in driving engagement to the cassette drive coupling means; and means for restraining withdrawal of the cassette from the apparatus without first forcibly displacing the cassette laterally away from its nesting position adjacent the wall surface, the improvement comprising:

at least one guide member having a first defined edge portion spaced apart from a second defined edge portion;

means associated with the wall surface and complementary to said guide member for connecting said guide member for movement relative to the wall surface between a first position wherein said first edge portion extends laterally outward of the wall surface beyond the profile of the drive head to engage an edge of the leading peripheral wall of a cassette as it enters the apparatus and said second edge portion is spaced inward of said first edge portion with respect to the opening and also extends laterally outward of the wall surface and a second position inward from said first position with respect to the opening; wherein said first edge portion of said guide member no longer extends laterally outward of the wall surface while said second edge portion of said guide member still extends laterally outward of the wall surface so as to engage the leading peripheral wall of the cassette upon complete insertion of the cassette within the apparatus receiving means, said first edge portion when in said first position operating to engage the edge of the leading peripheral wall of the cassette as it enters the apparatus in a manner such that upon continued insertion of the cassette into the apparatus, said guide member operates to guide the edge of the leading peripheral wall of the cassette past the drive head whereupon, said first edge portion is disengaged from the edge of the leading peripheral wall of the cassette which thereafter engages said second edge portion of said guide member to move said guide member from its said first position toward its said second position, and

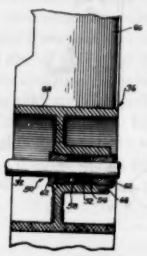
resilient means for yieldably urging said guide member to move from its said second position toward its said first position thereby resiliently urging the cassette when engaged by said second edge portion to move in a direction outwardly of said apparatus.

4,090,785

LOW NOISE BLOWER CLUTCH

Frank L. Weninger, Chicago, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Continuation-in-part of Ser. No. 573,208, Apr. 30, 1975, abandoned. This application May 3, 1976, Ser. No. 682,240
Int. Cl.[2] G03B *21/18*; F16D *7/02, 23/00*
U.S. Cl. 353—57 **4 Claims**



1. A low noise blower assembly for use in an image projector having a motor provided with a drive shaft, the assembly comprising:

blower means having a hub portion dimensioned larger than the motor drive output and being coupled to said drive shaft and

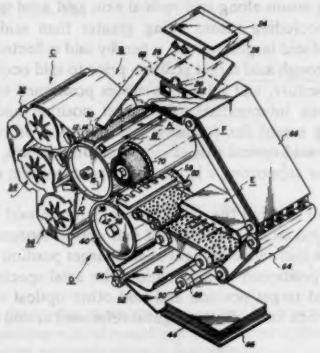
spring clutch means interposed in a viscous environment between said drive shaft and said hub portion, said spring clutch means comprising two oppositely wound connected windings arranged substantially concentrically and parallel with one another, and tensioned to provide a substantially constant torque output to said hub portion which is less than said blower means would experience if said hub portion were directly coupled to said drive shaft; a first inner winding of said spring clutch means being coupled to said drive shaft, said second winding engaging said hub portion of said blower means for drive transfer to said hub portion; said drive shaft turning in a direction which causes said first winding to tend to unwind itself from said shaft.

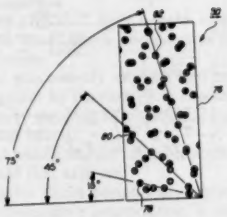
4,090,786

MULTI-COLOR SCREEN FOR ELECTROPHOTOGRAPHIC PRINTING

Richard M. Bobbe, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 21, 1976, Ser. No. 688,649
Int. Cl.[2] G03G *15/01*; G03B *27/76*
U.S. Cl. 355—4 12 Claims





1. An electrophotographic printing machine for reproducing an original document, including:

a photoconductive member;

means for charging at least a portion of said photoconductive member to a substantially uniform level;

means for projecting successive color filtered light images of the original document onto the charged portion of said photoconductive member; and

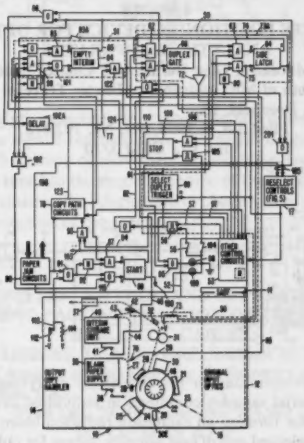
a substantially stationary screen member positioned in the path of the light image to modulate the light image irradiating the charged portion of said photoconductive member recording a modulated single color electrostatic latent image thereon, said screen member comprising a plurality of light filtering regions, each of the light filtering regions having a multiplicity of colored areas with the colors of each of the light filtering regions being different from one another and being substantially complementary in color to the color of one of the filtered light images with each of the light filtering regions being rotated a pre-selected angle relative to the next adjacent one of the light filtering regions.

4,090,787

AUTOMATIC COPIER MODE CONTROLS

James Henry Hubbard, Boulder; Ralph Joseph Leclere, Longmont, and Thomas Travis Underhill, Boulder, all of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 25, 1976, Ser. No. 661,233
Int. Cl.[2] G03G *21/00*
U.S. Cl. 355—14 18 Claims



15. A method of operating a document reproduction machine operable in a succession of independent copy runs, the steps of:

selecting an operational copy mode in said machine;

measuring elapsed time of non-use of said machine up to a predetermined time;

indicating an intermediate state of the machine during said non-use;

inhibiting said measuring during said intermediate state indication;

removing said intermediate state indication for enabling said measuring elapsed time beginning from said removal of said intermediate state indication; and

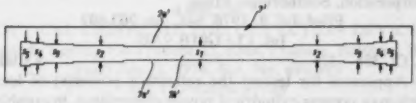
automatically selecting a dominant operational copy mode upon expiration of said measured predetermined time.

4,090,788

OPTICAL COPYING MACHINE

Hans A. Massengeil, Munich, Germany, assignor to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Nov. 10, 1976, Ser. No. 740,370
Claims priority, application Germany, Nov. 28, 1975, 2553666
Int. Cl.[2] G03B *27/76*
U.S. Cl. 355—71 10 Claims



1. In an optical copying machine wherein an original is imaged onto a photosensitive carrier, a combination comprising an imaging system including a source of modulated light and a mask having an elongated aperture through which light issuing from said source passes to impinge upon the original whereby such light exhibits the tendency to produce lighter and darker transverse streaks between the marginal portions of

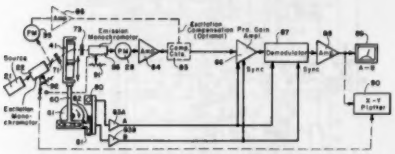
the photosensitive carrier; and means for effecting a relative movement between the original and said system so that light passing through said aperture impinges upon successive strip-shaped portions of the original, the width of said strip-shaped portions being a whole multiple of the quotient of the speed of said relative movement and the modulation frequency of light issuing from said source to counteract said tendency of modulated light to produce said streaks.

4,090,789

CUVETTE POSITIONING DEVICE FOR OPTICAL ANALYTICAL APPARATUS

James H. Macemon, Glen Burnie, and Charles Soodak, Silver Spring, both of Md., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Jul. 6, 1976, Ser. No. 702,473
Int. Cl.[2] G01J 3/30
U.S. Cl. 356—85 **13 Claims**



1. A spectrophotometer for alternately analyzing first and second material samples contained in individual cells including, means for forming an excitation radiation beam for application to a selected one of said samples, means for collecting an emission radiation beam from said selected one of said samples, means for detecting said emission radiation beam, means for positioning said samples in the path of said radiation beam including a cell carrier for supporting said cells in a substantially vertical relationship, said cells comprising elongate cuvettes of generally rectangular cross-section disposed in said cell carrier end-to-end and said cell carrier including a pair of complimentary dimensioned compartments for receiving said generally rectangular cuvettes with each compartment being configured in a manner to facilitate insertion and removal of said cuvette in and from said cell carrier and to facilitate impingement of said excitation radiation beam on, and emission of said emission radiation beam from, said samples, means for mounting said cell carrier in a substantially vertical operating path whereby one cell is disposed in the path of said excitation radiation beam at one position of travel and the other cell is disposed in the path of said excitation radiation beam at another position of travel, and drive means for reciprocating said cell carrier along said vertical operating path to alternately position said cells in said excitation radiation beam path.

4,090,790

APPARATUS FOR TESTING THE REFRACTIVE POWER(S) OF LENSES

Martin Stephen Dragon, Sturbridge, and Peter Parkhill Clark, Brookfield, both of Mass., assignors to American Optical Corporation, Southbridge, Mass.

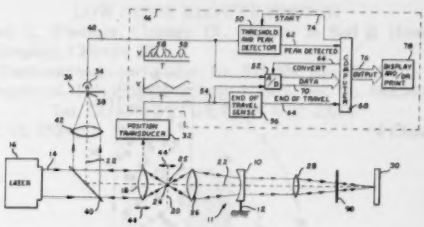
Filed Jul. 8, 1976, Ser. No. 703,492
Int. Cl.[2] G01B 9/00
U.S. Cl. 356—125 **9 Claims**

1. Apparatus for testing the refractive power(s) of lenses which may possess cylindrical power comprising, in combination:

(a) an optical system having an optical axis, said optical system comprising a station on said optical axis for a lens to be tested, a reflecting means at one end of said system, a laser emitting a collimated beam of light, a target lens through which said collimated laser beam passes for focusing said beam in a small generally circular diffraction image substantially coaxial with said optical axis at a target position on said optical axis for projection through said optical system along said optical axis, said projected light being reflected back through said optical system along said optical axis by said reflecting means, means for focusing said projected light at said reflecting means and for refocusing said reflected light at said target position, occluding means having a small, generally circular aperture therein on said optical axis, said occluding means being positioned on said optical axis at a position optically equivalent to said target position, said occluding means and said target position being axially spaced from said reflecting means along said optical axis, said axial spacing of said occluding means being greater than said axial spacing of said target position whereby said reflected light passes through said target position prior to said occluding means aperture, and relay lens means positioned on said optical axis intermediate said target position and said occluding means for focusing said reflected diffraction image on said optical axis at said occluding means;

(b) means for supporting a lens in said optical system at said station;

(c) means for varying the axial spacing between said target position and an other portion of said optical system so as to refocus said reflected light at said target position when a lens is positioned at said station, the axial spacing between said target position and said other optical system portion when said reflected light is refocused at said target



position being indicative of the refractive power in a respective one of the principal meridians of said lens;

(d) light sensing means positioned to receive only that portion of said light reflected back through said optical system and said occluding means aperture and to generate an electrical signal the amplitude of which is related to the intensity of said sensed light, said diffraction image and said aperture each being configured such that the intensity of said sensed light peaks whenever said reflected light is substantially refocused at said occluding means and said target position in each principal meridian of a said lens regardless of the angular orientation of said principal meridian, there being a single said peak when the lens at said station only possesses sperical power and two said peaks when the lens additionally possesses cylindrical power; and

(e) means coupled to said light sensing means and being responsive to at least said light intensity signal for indicating substantially the refractive powers of the respective principal meridians of a lens positioned at said station as a function of the occurrence of said sensed light intensity peaks relative to said axial spacing between said other portion of said optical system and said target position whereby both the spherical power and the cylindrical power of the lens at said station are determined without regard for the angular orientation of the principal meridians of said lens about said optical axis.

4,090,791

DEVICE FOR CYCLICALLY REPEATING A SERIES OF COLORIMETRIC ANALYSIS ON EACH OF A SUCCESSION OF SAMPLES

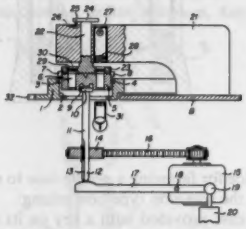
Iqbal Siddiqi, Veyrier; Tito Suvá, Chatelaine, both of Switzerland, and Christian Roehrich, Chaillevette, France, assignors to Battelle Memorial Institute, Carouge, Switzerland

Filed Oct. 18, 1976, Ser. No. 733,719

Claims priority, application Switzerland, Oct. 29, 1975, 13984/75

Int. Cl.[2] G01J *3/50*

U.S. Cl. 356—184 10 Claims



1. A device for carrying out a series of colorimetric analyses on respective sets of samples in a recurrent cycle, comprising:

a carrier rotatable about a first axis;

a multiplicity of separate receptacle holders mounted on said carrier in an annular array centered on said first axis, each of said holders including a plurality of transparent receptacles forming a set adapted to contain samples taken from a common specimen;

a testing station provided with a light source emitting a polychromatic beam and a photometric detector in the path of said beam;

drive means for successively moving said holders through said testing station by intermittently rotating said carrier, with consecutive stepping of all receptacles of a set across the path of said beam;

a support at said testing station rotatable about a second axis offset from said first axis; and

a plurality of color filters peripherally equispaced on said support for consecutive interposition in the path of said beam, said drive means including transmission means for intermittently rotating said support about said second axis in synchronism with the stepping of said receptacles for joint translumination of each filter and a respective receptacle temporarily aligned therewith, all the receptacles of a set being transluminated during a single rotation of said support.

4,090,792

SINGLE BEAM PHOTOMETER FOR INVESTIGATING A SPECIMEN

Konrad Bunge, Cologne, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jun. 22, 1976, Ser. No. 698,559

Claims priority, application Germany, Jul. 9, 1975, 2530480

Int. Cl.[2] G01J *3/50;* G01N *21/24*

U.S. Cl. 356—188 11 Claims

1. A single beam photometer for investigating a specimen, comprising:

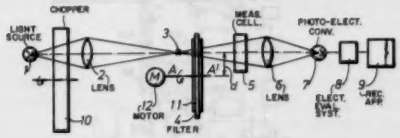
a. source means for projecting a beam of light in a predetermined path in the form of a closely limited cone;

b. a graded interference filter having an optical axis and a range of wavelength transmission substantially coinciding with the absorption wavelength of the specimen to be investigated, means mounting the filter for positioning same in the path of said beam of light at the closely limited cone;

c. moving means connected to the mounting means of said interference filter for periodically moving said filter relative to said beam of light at a basic frequency to modulate said beam of light;

d. cell means for holding a specimen to be investigated disposed in the path of said modulated light beam;

e. receiving means receptive of the beam of light passing



through the specimen for converting said beam into information signals representative of a single harmonic of the basic frequency of movement of said filter; and

f. means tuned to the single harmonic of the basic frequency for evaluating the information to obtain values of a desired characteristic of the specimen.

4,090,793

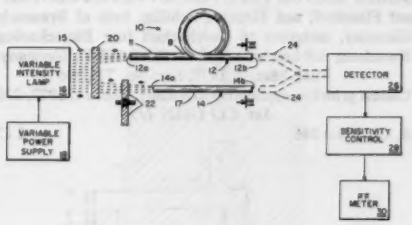
PHOTOMETRIC METHOD AND APPARATUS FOR MEASURING PACKING FRACTION OF TERMINATED FIBER OPTIC CABLES

Robert L. Lebduska, La Mesa, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 29, 1976, Ser. No. 736,902

Int. Cl.[2] G01N *21/22*

U.S. Cl. 356—205 9 Claims



1. A photometric method for measuring the packing fraction of a length of fiber optic cable having a known bundle diameter comprising the step of;

varying a light intensity transmitted through a calibration rod of known diameter to simulate the physical characteristics of the fiber optic cable; and

comparing the light intensity transmitted through the fiber optic cable to the light intensity transmitted through the calibration rod, whereby the packing fraction of the fiber optic cable can be determined.

4,090,794

OPTICAL CIGARETTE END INSPECTION DEVICE

Fernando Benini, Via Predosa 21, Zola, Predosa, Bologna, Italy

Filed Jun. 1, 1976, Ser. No. 691,919

Int. Cl.[2] G01N *21/48*

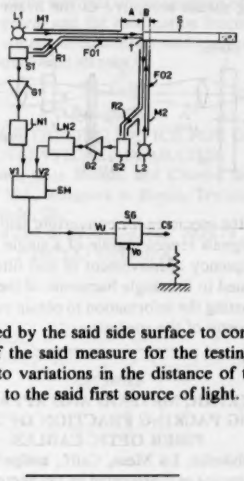
U.S. Cl. 356—209 3 Claims

1. A method for the testing through optical inspection of cigarette ends, comprising the steps of:

a) axially illuminating the end surface of the cigarette by a first source of light having a constant intensity, and utilizing the light reflected by the said end surface as a measure for the testing;

b) illuminating a portion of the side surface of the same cigarette end by another source of light perpendicular to

said first source of light and having a constant intensity, providing a predetermined field of inspection of which only one part covers said side surface, and utilizing the



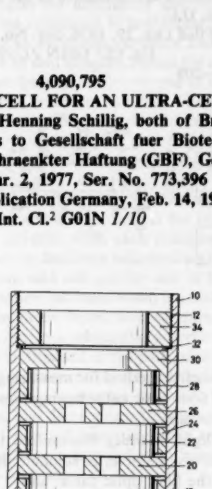
light reflected by the said side surface to compensate the variations of the said measure for the testing which are consequent to variations in the distance of the cigarette with respect to the said first source of light.

4,090,795

DOUBLE SECTOR CELL FOR AN ULTRA-CENTRIFUGE

Josef Flossdorf, and Henning Schillig, both of Braunschweig, Germany, assignors to Gesellschaft fuer Biotechnologische Forschung mit beschraenkter Haftung (GBF), Germany

Filed Mar. 2, 1977, Ser. No. 773,396
Claims priority, application Germany, Feb. 14, 1977, 2706170
Int. Cl.² G01N *1/10*
U.S. Cl. 356—246 **2 Claims**



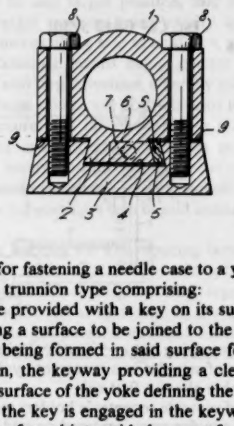
1. A tandem, double-sector analytical cell for an ultra-centrifuge comprising a tubular housing, a lower window maintained in said housing by a lower window holder, an upper window maintained in said housing by an upper window holder and a specimen cell assembly maintained between said upper and lower windows, said assembly including a center window, a centering ring surrounding said center window, and first and second sector cell centerpieces located on opposite sides of said center window, each having a pair of sector cell chambers and filling holes connected to said chambers, said housing including radial filling opening aligned with said filling holes and adapted to be closed by sealing plugs, said sector cell chambers being arranged for series transmission of light through respective chambers in said first and second centerpieces.

4,090,796

DEVICE FOR FASTENING NEEDLE CASE TO YOKE IN UNIVERSAL JOINT OF TRUNNION TYPE

Hiroji Okuda, and Shigenori Harada, both of Nara, Japan, assignors to Koyo Seiko Company, Limited, Osaka, Japan

Filed Jul. 25, 1977, Ser. No. 819,217
Int. Cl.² F16D *3/26*
U.S. Cl. 403—24 **4 Claims**



1. A device for fastening a needle case to a yoke in a universal joint of the trunnion type comprising:

a needle case provided with a key on its surface,

a yoke having a surface to be joined to the needle case and a keyway being formed in said surface for receiving the key therein, the keyway providing a clearance between the inside surface of the yoke defining the keyway and the key when the key is engaged in the keyway,

a wedge to be forced into said clearance for tightly holding the needle case to the yoke in intimate contact with each other, said wedge including a wedge body to be driven into the clearance and a wedge head projecting from the body,

a means for removing the wedge provided at the head end of the wedge, and

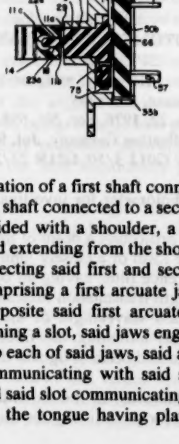
a plurality of bolts for fastening the needle case to the yoke.

4,090,797

MECHANICAL COUPLING

James N. Hufford, and Wayne A. Barden, both of Elkhart, Ind., assignors to CTS Corporation, Elkhart, Ind.

Division of Ser. No. 516,749, Oct. 21, 1974, Pat. No. 3,996,549.
This application Sep. 16, 1976, Ser. No. 723,889
Int. Cl.² F16C *11/06*
U.S. Cl. 403—157 **8 Claims**



1. The combination of a first shaft connected to an electrical control, a second shaft connected to a second control, said first shaft being provided with a shoulder, a tongue integral with said first shaft and extending from the shoulder, and a coupling device interconnecting said first and second shafts, said coupling device comprising a first arcuate jaw, a second arcuate jaw disposed opposite said first arcuate jaw, said first and second jaws defining a slot, said jaws engaging said tongue, an arm connected to each of said jaws, said arms defining a cylindrical cavity communicating with said slot, said arms being supported by and said slot communicating with one end of the coupling device, the tongue having planar and substantially

parallel sides and a thickness substantially equal to the spacing between the jaws, one end of said tongue being suspended within said cavity, the cavity being larger than the tongue, said shoulder and said one end of the coupling device being spaced apart whereby said coupling device is capable of axial and lateral movement along said tongue and said jaws provide for pivotal motion of said tongue about said jaws.

4,090,798

DEVICE FOR JOINING HOLLOW SECTIONS

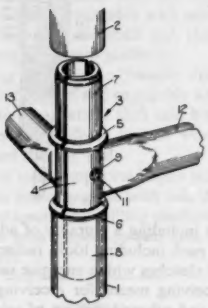
Peter Barton, 11 Hintlesham Avenue, Edgbaston, Birmingham, England

Filed Jul. 6, 1976, Ser. No. 702,567

Claims priority, application United Kingdom, Aug. 21, 1975, 34716/75

Int. Cl.[2] F16B *21/10*

U.S. Cl. 403—171 **5 Claims**



1. A connecting means having a pair of component parts and wherein each component part of the connecting means for joining together tubular members comprises a pair of spigot portions extending in opposite directions from a boss, each spigot having a cross-section which is substantially half of that of one of said members so that a pair of components placed face to face from a pair of oppositely extending complete spigots for insertion respectively within said members, said boss having on its outer periphery part annular radially outwardly extending shoulders at each longitudinal end thereof and being solid and of part cylindrical cross-section, said boss having a screw substantially diametrically disposed therein apt for transverse movement with respect to said boss located such as to engage a similar screw which is diametrically opposed thereon on another component in a pair thereof when placed face to face whereby said screw can be rotated into mutual engagement with said similar screw to urge said pair of components away from one another and thereby provide resistance to withdrawl of said spigots from said tubular members, a further tubular member secured to the surface of said boss, wherein the further tubular member extends in a direction different from the spigot portions.

4,090,799

MITER JOINT FOR HOLLOW PLASTIC FRAME MEMBERS

Giacomo Crotti, Occhiobello (Rovigo), and Erminio Diolaiti, S. Lazzaro di Savena (Bologna), both of Italy, assignors to Color-Plast S.p.A., Rovigo and Generale Ultrasuoni S.p.A., Bologna, both of, Italy

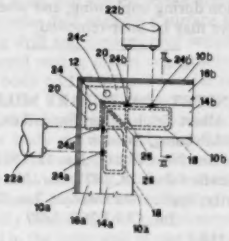
Filed Oct. 21, 1976, Ser. No. 734,623

Claims priority, application Italy, Oct. 21, 1975, 64508 A/75

Int. Cl.[2] B25G *3/36*; F16B *2/20*

U.S. Cl. 403—401 **6 Claims**

1. An angular connection for a frame or counterframe composed of converging hollow sections of plastic material, the connection comprising at least one plastic angular element having legs, said legs being inserted and fitting firmly in respective ones of said converging sections. walls of said sections being welded to said legs by ultrasonic spot welds, wherein said plastic angular element connecting said bodies of said



sections is in the shape of a hollow "L" having internal partitions connecting short walls with the long walls of said "L", and including at least one ultrasonic spot weld applied to the outside perimetric surface of said bodies of said sections in correspondence with said partitions.

4,090,800

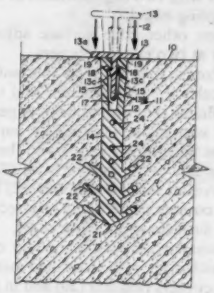
JOINT-FORMING DEVICE

Vergil W. Koch, 1123 King St., Redwood City, Calif. 94002

Continuation-in-part of Ser. No. 705,413, Jul. 15, 1976, abandoned. This application Dec. 8, 1976, Ser. No. 748,522

Int. Cl.[2] E01C *11/04*

U.S. Cl. 404—48 **5 Claims**



5. An elongated joint-forming structure for use with settable compositions used for slab-like installations, comprising:

a vertically elongated, pliable main section of relatively flexible material, with a plurality of water-sealing fins extending outwardly from opposite sides of its lower end, and a split upper end formed by a pair of spreadable vertical walls connected at their lower ends and having upper surfaces establishing a bearing surface for a downwardly applied load, each of said vertical walls including a spacing lip on its inner side near its upper end, holding the walls spaced apart and forming a permanent cavity between the walls below the lips;

a T-shaped implanting member of relatively rigid material, having a vertical stem extending between said vertical walls and a top flange having lower surfaces positioned against said bearing surface and an upper surface adapted to be engaged by an implanting implement, said T-shaped implanting member including a pair of clip means extending generally vertically downwardly in spaced parallel relationship to one another from the top flange, for engaging the outsides of the vertical walls of the main section, to add further stability to the joint-forming structure during implanting;

whereby the main section and the attached implanting mem-

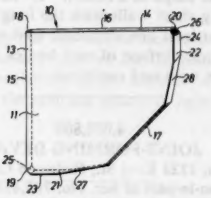
ber may be driven downwardly into a slab prior to setting until said bearing surface of the main section is at least flush with the slab surface, said top flange adding horizontal aligning rigidity and said stem in said cavity, along with said clip means, adding vertical stability to the pliable main section during implanting, and whereby the implanting member may be later removed.

4,090,801

CUTTING INSERT AND ROTARY MILLING CUTTER

Kurt Heinrich Albert Erich Faber, Sandviken, Sweden, assignor to Sandvik Aktiebolag, Sweden

Continuation of Ser. No. 648,017, Jan. 12, 1976, abandoned. This application Jan. 28, 1977, Ser. No. 763,362
Claims priority, application Sweden, Jan. 23, 1975, 7500697
Int. Cl.[2] B26D *1/00*
U.S. Cl. 407—113 **5 Claims**



1. A reversible cutting insert for use in a rotary milling cutter comprising

a polygonal flat plate, the top and bottom surfaces of which intersect with two edge surfaces of equal length to define main cutting edges,

at least one other edge surface adjoining said two edge surfaces at two cutting corners,

characterized in that said plate substantially is in the shape of an isosceles triangle, wherein said two surfaces (**13**) and (**14**) defining the main cutting edges are perpendicularly related, whereas said other edge surface (**17**) extends in a direction generally transverse to the bisector of the angle between said two edge surfaces (**13**) and (**14**), and two plain bevelled surfaces (**21**) and (**22**) being provided at said cutting corners respectively intersecting with said top and bottom surfaces at an acute angel,

said last junction defining secondary cutting edges (**23**) and (**24**) which meet with associated main cutting edges at the cutting corners (**19**) and (**20**) and in parallel with opposed edge surfaces (**14**) and (**13**) respectively.

4,090,802

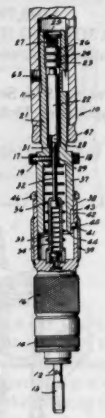
RADIO DETECTOR FOR DETECTING DULL AND BROKEN TOOLS

Reiner Bilz, Stuttgart, Germany, assignor to Otto Bilz Werkzeugfabrik, Germany

Filed Dec. 27, 1976, Ser. No. 754,367
Int. Cl.[2] B23B *49/00*
U.S. Cl. 408—6 **10 Claims**

1. A device for preventing overload of an axially loaded tool comprising, a tool supporting member for receiving a tool in one end and adapted to be received into a motor driven chuck at its other end, said tool supporting member formed of first and second parts, an overload clutch mounted between said first and second parts such that when overload occurs said first and second parts move toward each other to shorten said tool supporting member, a radiant energy transmitter connected to said tool supporting member and actuated when said first and second parts move toward each other, and wherein said tool supporting member is hollow and said transmitter is mounted therein, and an antenna mounted to said tool supporting member and electrically connected to said transmitter.

9. A device for preventing overload of an axially loaded tool comprising, a first tool supporting member for receiving a tool in one end and adapted to be received into a motor driven chuck at its other end, said first tool supporting member formed of first and second parts, an overload clutch mounted between said first and second parts such that when overload occurs said first and second parts move toward each other to shorten said tool supporting member, a radiant energy transmitter connected to said first tool supporting member and actuated when said first and second parts move toward each



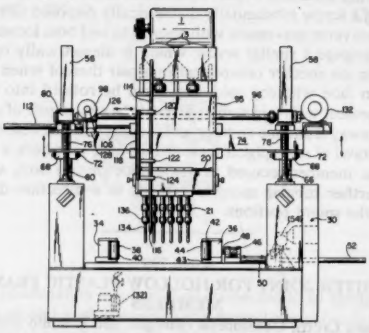
other, further including a plurality of additional tool supporting members each including tools, radiant energy transmitters and overload clutches which energize said transmitters during overload, receiving means for receiving radiation from said transmitters, and wherein certain of said transmitters radiate different signals and said receiver means includes portions responsive to said different signals to detect and respond to signals from particular transmitters.

4,090,803

DRILLING HEAD SYSTEM FOR I-BEAMS

Ernest K. Haley, 1210 Old Cannons La., Louisville, Ky. 40205

Filed Mar. 1, 1977, Ser. No. 773,238
Int. Cl.[2] B23B *39/16*
U.S. Cl. 408—12 **4 Claims**



1. A drilling head system for adjustable support of a plurality of drilling spindles of the type used in drilling holes in structural members such as I-beam webs comprising:

A. A base adapted for retention of an I-beam to be drilled and defining a drilling area;

B. At least two vertical support posts mounted in said base, so as to movably support a spindle head drilling platform in superposed relationship with respect to said base;

C. At least four vertical threaded shafts mounted in said base

and extending vertically with respect to said base and in parallel relationship with respect to said support posts; including a worm gear individually engaging each such shaft, so as to move vertically said spindle head drilling platform at its four corners;

D. A horizontally disposed spindle head drilling platform mounted at its sides upon said support posts and including a plurality of threaded shaft apertures such that said threaded shafts may extend therethrough; said spindle head drilling platform including a plurality of friction pad housings, having individually adjustable friction pads engaging the exterior surfaces of said support posts;

E. A drilling housing including a plurality of drilling spindles and drilling spindle drive means, said housing being horizontally, adjustably mounted upon said drilling platform and said drilling spindles extending downwardly into said drilling area; said drilling housing being mounted upon a slidable carriage and including laterally extending threaded jack shafts, together with drive means mounted upon said platform and engagable with said jack shafts so as to move horizontally said shaft and, thus, said drilling housing with respect to said platform;

F. Drilling housing horizontal adjustable drive means supported upon said platform and engagable with said drilling housing, so as to horizontally shift said housing and said drilling spindles with respect to said work area and an I-beam supported therein; and

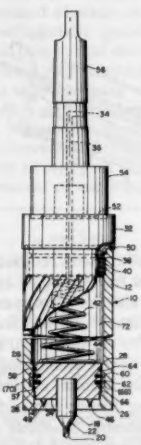
G. A vertical drive means supported upon said spindle head drilling platform and engagable with said threaded shafts, so as to raise and lower said drilling platform and thus said drilling spindles with respect to said area and an I-beam supported therein.

4,090,804

CIRCULAR DRILL WITH CENTERING DEVICE

Ernest K. Haley, 1210 Old Cannon Lane, Louisville, Ky. 40205

Filed Feb. 4, 1977, Ser. No. 765,718
Int. Cl.[2] B23B *27/10, 51/06*
U.S. Cl. 408—59 **8 Claims**



1. In a cutting head assembly of the type adapted to be rotatably driven about its longitudinal axis and comprising a circular cutting head having a body portion with a plurality of cutting teeth circumferentially disposed with respect to its lower open end, the improvement comprising:

A. A centering drill inwardly and concentrically positioned within said body portion such that an inner cutting head extends axially outwardly beyond the cutting teeth of said circular cutting head, said centering drill being:

i) registrable at its periphery with the body portion of said outer circular drill in an initial cutting mode and

ii) axially depressable within said body portion of said circular cutting head into a mode of non-registry with said body portions of said cutting head as a centering hole is cut, such that said centering drill ceases to rotate as said circular drill engages a surface to be cut, and

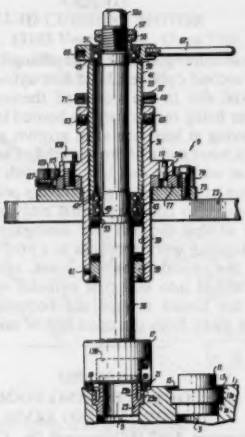
B. A centering drill and coolant plug supporting in its periphery a liquid sealing means engageable with the inner wall of said body portion of said circular cutting head and supporting in its lower mid-portion said centering drill, said body portion including a lubricating channel extending into the body portion and openable so as to flow lubricant, as said centering drill is depressed to its mode of non-registry said centering drill and coolant plug including a plurality of ball detents embedded in its periphery and outwardly extending into complementary registering slots defined in the inner wall of said body portion so as to index said centering drill ad coolant plug with the body portion of said circular cutting head in said initial cutting mode.

4,090,805

CUTTING TOOL FOR REMOVING GOVERNOR CHEST NOZZLES AND REFINISHING THE NOZZLE SEATS

Ernest E. Grimsley, 4533 Wake Forest Rd., Portsmouth, Va. 23703

Filed Jul. 28, 1977, Ser. No. 819,929
Int. Cl.[2] B23B *41/00, 47/18*
U.S. Cl. 408—111 **8 Claims**



1. A cutting tool for removing nozzles from a governor chest, said nozzles being seated in and welded to the bottom of said governor chest, said cutting tool comprising:

an adapter plate having an elongated opening therein and adapted for mounting on the top of the governor chest after the cover has been removed therefrom;

means for attaching said adapter plate to the governor chest;

a drive shaft;

support means supporting said drive shaft for movement along and about its own axis, said support means supporting said drive shaft in a position extending through said opening whereby the top of said drive shaft is above the plane of said adapter plate and the bottom is within said governor chest;

attachment means for fixedly attaching said support means to said adapter plate at any one of a plurality of lateral positions, the axis of said drive shaft being centered over one of said nozzles at each of said lateral positions;

a cutter head attached to said drive shaft and carrying tool

bit means on said cutter head for cutting the weld material which welds said nozzles to the bottom of said governor chest; and,

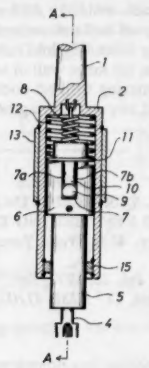
means for rotating and axially advancing said drive shaft.

4,090,806

TAPPING SPINDLE HAVING AUTOMATIC DEPTH CONTROL

Taizo Kato, 3007-104 Obatahigashijima, Moriyamaku, Nagoya, Japan

Filed Aug. 18, 1976, Ser. No. 715,265
Int. Cl.[2] B23G 1/46
U.S. Cl. 408—139 **4 Claims**



1. A thread cutting spindle, comprising:

first and second cylinders, said first cylinder having at least one axial slot in the side wall thereof and said second cylinder being reciprocatably housed in said first cylinder and having at least one axial groove, said groove having an open inner end and the top sides of said second cylinder adjacent said open end being beveled; and,

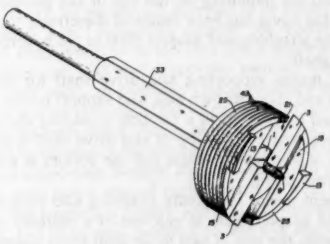
at least one ball and roller pair slidably positioned in said slot and groove to couple the first and second cylinders together so that the ball will disengage from the groove when tapping work proceeds to a predetermined depth to move the cylinders axially apart, said second cylinder being biased into said first cylinder while said ball and roller are biased toward the bottoms of said slot and groove away from the open end of said groove.

4,090,807

AXIALLY SUPPORTED BORING TOOL AND METHOD FOR MAKING SAME

Arthur A. Stewart, 4487 Hillsborough Dr., Castro Valley, Calif. 94546

Filed Sep. 20, 1976, Ser. No. 725,002
Int. Cl.[2] B27G 15/00
U.S. Cl. 408—213 **1 Claim**



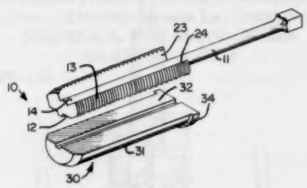
1. A drill bit comprising a cutter blade assembly including a hub, cutter blades extending radially outward from said hub and adapted to cut a circular hole in work upon application of said bit to such work, a cylindrical skirt defining a cylindrical surface, said cutter blades each having one end thereof located in a surface common to said skirt cylindrical surface with said skirt cylindrical surface being in the line of angular travel of the one ends of such cutter blades for stabilizing said bit axially of the desired hole during a drilling operation, said cylindrical skirt having a pair of chip openings defined therein one chip opening being located adjacent each cutter blade and extending through said skirt at an angle to the longitudinal centerline of said skirt, said chip opening forming edges of said skirt, the angular orientation of said chip opening causing the trailing portion of one edge to overlap the leading portion of the other edge to provide the equivalent of a complete cylindrical surface in maintaining stability of said bit during drilling, radius segments radiating laterally from said cutter blades and being integrally attached to said skirt for approximately half the circumference of said skirt, spurs depending from said skirt to a point below said radius segments and with their outer surfaces common to said skirt surface, and guiding means for guiding the drill bit through a material in the axial direction of the drill bit, said guiding means including a pilot attached to said hub and having threads defined thereon for drawing the drill bit into material to be drilled, and threads defined on the outer surface of said skirt, said threads being fewer in number per inch than the threads in said pilot, and engaging the sides of a hole being made in the material by the drill bit to advance the drill bit axially through the hole.

4,090,808

TAPPING DEVICE

William G. Nannen, 110 W. Main St., Smethport, Pa. 16749

Filed Aug. 16, 1976, Ser. No. 714,679
Int. Cl.[2] B23D 77/14
U.S. Cl. 408—222 **7 Claims**



1. A tapping device for use in rethreading damaged threads in a tapped opening or for tapping an opening wherein a cutting means is inserted into the opening and is adapted to cooperate with a guide member inserted into the opening adjacent to the cutting means to cut threads in a work surface of the opening, said tapping device comprising:

cutting means which include at least one thread cutting surface for cutting threads into said work surface;

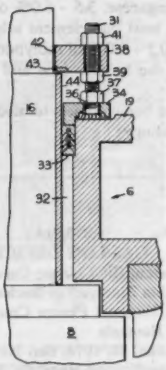
a guide member slideably insertable into said opening between said cutting means and said work surface, said guide member having a surface contacting said cutting means and a surface contacting said work surface to maintain the cutting surfaces of said cutting means in operative alignment and contact with said work surface; and

an axially extending arm structurally adapted to accommodate a turning means to cooperate with said cutting means and said guide member, to rotate said cutting means and said guide member when said turning means applies a rotational force to said arm.

4,090,809
COMBINATION ADJUSTABLE THRUST RING AND SHAFT PACKING RING FOR HYDRAULIC TURBINE WICKET GATES

James L. Kepler, York, Pa., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Nov. 22, 1976, Ser. No. 744,086
Int. Cl.[2] F01B 25/10; F03B 3/18
U.S. Cl. 415—163 2 Claims



1. In a hydraulic turbine having a runner covered by the turbine head cover, the improvement comprising:

a plurality of wicket gates positioned about said runner and each gate including an elongated shaft extending through said head cover;

means engaging said head cover and connected to said elongated shaft to resist axial movement of said gate in one direction;

a thrust surface formed on said elongated shaft;

shaft packing located between said shaft and said head cover;

a thrust ring positioned adjacent said thrust surface;

a packing ring positioned adjacent said packing; and

a plurality of circumferentially spaced support means connected to said head cover about said shaft, both said thrust ring and said packing ring independently and adjustably connected to said support means adjacent to said thrust surface and said shaft packing respectively and for selective independent adjustment of each ring to obtain the desired clearance between said thrust ring and said surface to resist movement of said gate in the opposite direction and to resist movement of said shaft packing.

4,090,810
LIQUID-COOLED TURBINE BUCKET WITH ENHANCED HEAT TRANSFER PERFORMANCE

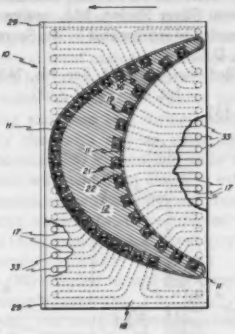
James T. Dakin, Schenectady; Kenneth A. Darrow, Sprakers, and Robert K. Alff, Ballston Lake, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 23, 1977, Ser. No. 780,292
Int. Cl.[2] F01D 5/18
U.S. Cl. 416—97 R 6 Claims

1. In liquid-cooled turbine bucket construction comprising an airfoil-shaped portion, a platform portion and a root portion, wherein said root portion is specifically shaped for engaging a rotor structure for rotation of said bucket in a predetermined planar direction and at least said airfoil-shaped portion has a plurality of sub-surface coolant passages extending along the pressure and suction faces thereof, the improvement comprising:

said coolant passages extending spanwise of said airfoil-shaped portion;

a plurality of longitudinally-extending spanning elements affixed within an individual coolant passage, said spanning elements being spaced from adjacent spanning elements with each of said spanning elements having one end

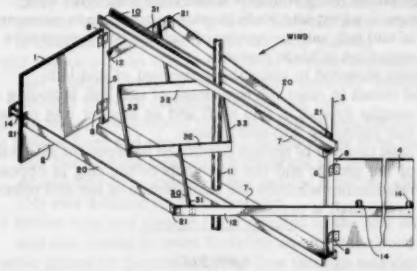


thereof affixed in the region of the most trailing portion of said coolant passage at the given station therealong relative to said predetermined planar direction.

4,090,811
FLUID CURRENT MOTOR

Michael L. Greene, 13103 Venango Rd., Oxon Hill, Md. 20022

Filed Sep. 23, 1976, Ser. No. 724,718
Int. Cl.[2] F03D 3/06
U.S. Cl. 416—119 2 Claims



1. A working fluid apparatus comprising:

at least one frame secured to a rotatable shaft,

said frame including horizontal cross-members secured at their centers to said shaft and vertical brackets secured at their ends to the ends of said horizontal cross-members;

at least two pair of flat cooperating vanes including an innermost and outermost vane with adjacent edges hinged to each vertical bracket of said frame and relative to each other so that their apex faces the flane of said frame;

a horizontal rod affixed to said outermost vane of each pair of vanes and extending horizontally forward of said outermost vane;

a second rod hinged to said innermost vane of each pair of vanes ahd hinged to said extending horizontal rod affixed to a diametrically opposite outermost vane; and

a rod means,

said rod means including a third rod with an aperture therein,

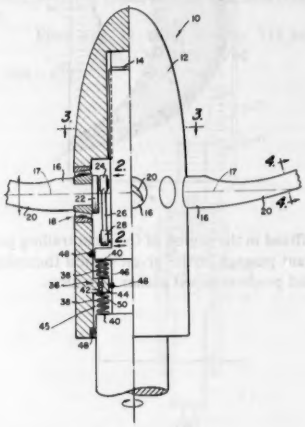
said third rod hinged at each end to a horizontally extending rod.

4,090,812

AXIAL FAN WITH AUTOMATICALLY CONTROLLED VARIABLE PITCH BLADES

David D. Moran, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 19, 1976, Ser. No. 743,367
Int. Cl.[2] B63H 3/00
U.S. Cl. 416—133 3 Claims



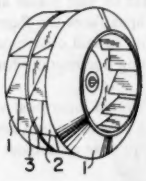
1. An axial fan with automatically controlled variable pitch blade comprising:
a rotatable drive shaft;
an axially slidable hub connected to said drive shaft for rotation therewith;
a plurality of airfoil blades attached to said hub;
said blades being rotatable about their respective axes;
means to adjust said blade in pitch in response to movement of said hub, said movement of said hub being responsive to variations in blade pressure;
means mounted to resist the movement of said hub;
said means to resist the movement of said hub including an annular groove in said shaft and an annular ring on said hub extending into said groove;
at least one pair of springs positioned between the side walls of the groove and the side walls of the ring in opposed relationship whereby the axial motion of the hub relative to the shaft is opposed.

4,090,813

HIGH-EFFICIENCY TURBO-MACHINE IMPELLERS

Akira Minato; Tutomu Shimizu, both of Hitachi, and Yosio Kanekiyo, Tsuchiura, all of Japan, assignors to Hitachi, Ltd., Japan

Filed May 11, 1976, Ser. No. 685,696
Claims priority, application Japan, May 14, 1975, 50-56150
Int. Cl.[2] F04D 29/28
U.S. Cl. 416—184 24 Claims



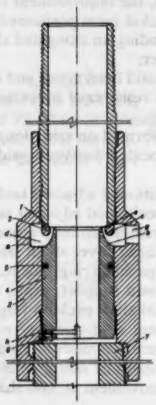
1. An impeller for gas handling apparatus comprising:
an annular center plate;
annular side plates each arranged at either side of the plane of said center plate with a predetermined spaced therebetween;
a plurality of blades arranged circumferentially with respect to one another and affixed to each of said center plate and said side plates in the substantially axial direction;
a shaft disposed in the center of said arranged blades;
said center plate, said side plates and said blades being made of a martensite alloy steel consisting essentially, based on weight, of 0.04 – 0.15% of carbon, up to 2% of silicon, 0.2 – 2.0% of manganese, 3.5 – 6.0% of nickel, 10 – 16% of chromium, at least one element selected from the group consisting of 0.5 – 3.0% of molybdenum and 0.01 – 0.8% niobium, and the balance iron and inevitable impurities; and
said center plate being joined to said side plates and said blades by welding.

4,090,814

GAS-LIFT DEVICE

Constantin Teodorescu; Ilie Chiriac; Cornel Doru Sava; Adrian Draghici, and Sabin Zinca, all of Bucharest, Romania, assignors to Institutul National Pentru Creatie Stiintifica si Tehnica, Bucharest, Romania

Filed Jan. 28, 1976, Ser. No. 653,004
Claims priority, application Romania, Feb. 12, 1975, 7581391
Int. Cl.[2] F04F 5/00
U.S. Cl. 417—178 1 Claim

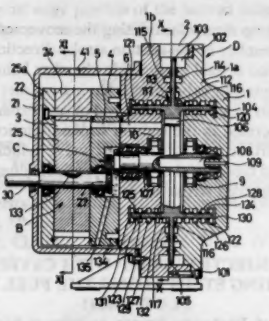


1. A gas-lift device characterized in that, with the purpose of increasing the efficiency and reducing the lift-gas consumption, it consists of a cylindrical adapting part (1), at the lower end of which is mounted by screwing on a profiled part (3); a joining sleeve (2) in which is screwed internally a male union (4) having an elastic zone (h) cut in its lower portion which permits the blockage of sleeves (2 and 4) by a blocking screw (6); a nozzle for supplying lift-gases, formed of an equalization chamber (d) edged by a profiled inner wall (b) of the male union (4), by a curved profile (c) of the profile part (3) and by the inner wall (a) of the joining sleeve (2), for the communication of the nozzle with the gas supplying duct being provided with some apertures (g) formed circumferentially in the wall of the threaded joining sleeve (2); and annular periphery slot (e), formed between the profiled inner wall (b) of the male union (4) and the curved profile (c) of the profiled part (3); a depressed straight baffle (f) placed at the exit end of the peripheral annular slot (e), the dimensions of which may be modified, as in the case of the slot according to lifting depth, by screwing the profiled part (3) with imposed dimensions.

4,090,815
HIGH VACUUM PUMP

Kazuaki Nakamura, Kariya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Japan

Filed Dec. 3, 1976, Ser. No. 747,428
Claims priority, application Japan, Dec. 3, 1975, 50/144273
Int. Cl.[2] F04B *23/12, 23/14;* F01D *1/36;* F03B *5/00*
U.S. Cl. 417—203 8 Claims



1. A high vacuum pump mechanism comprising:

a molecular pump assembly including a housing having inlet and outlet ports, spiral groove means formed within the interior walls of said housing so as to thereby establish fluidic communication between said ports, said spiral groove means having main and subsidiary groove means, one end of said subsidiary groove means being closed from said inlet port and the other thereof being open to said outlet port, a circular disk interposed between said interior walls so as to face said walls with small clearances therebetween, a drive shaft carrying said disk thereon so as to thereby cause the latter to rotate so that a compression and pumping operation of the fluid is achieved along said spiral groove means from said inlet port to said outlet port, and a high vacuum seal mechanism for said drive shaft so as to thereby define a forepressure chamber which is in communication with said outlet port;

an oil-sealed rotary pump assembly including a body having inlet and outlet ports wherein said inlet port of said rotary pump is directly connected to said outlet port of said molecular pump assembly and said outlet port of said rotary pump is exposed atmospheric conditions, a rotor eccentrically arranged within a bore of said body so as to form variable volume chambers which connect to said inlet and outlet ports of said rotary pump, and a drive shaft carrying said rotor thereon so as to thereby cause the latter to rotate so that a compression and pumping operation of said fluid is achieved through said variable volume chambers from said inlet port to said outlet port of said rotary pump; and

a speed reduction mechanism between said two drive shafts so as to impart a driving force to one of said drive shafts when the other one of said drive shafts is driven.

4,090,816
ELECTROMAGNETIC FLUID OPERATING APPARATUS

Shiro Takahashi, Tokyo, Japan, assignor to Man Design Co., Ltd., Tokyo, Japan

Filed Oct. 7, 1976, Ser. No. 730,655
Claims priority, application Japan, Oct. 14, 1975, 50-122942; Sep. 2, 1976, 51-104252
Int. Cl.[2] F04B *17/04, 39/06, 35/04*
U.S. Cl. 417—371 21 Claims

1. An electromagnetic fluid operating apparatus in which an armature (110) forming one unified body assembly with a piston assembly (111) moves rearwardly in a direction substantially at a right angle to the magnetic flux generated in the region between a spaced pair of confronting magnetic poles (22) of a stator core (20) having induction coils connected via a half-wave rectifier to a given AC source due to electromagnetic attraction and moves forwardly under the influence of a mechanical biasing means; characterized in that:

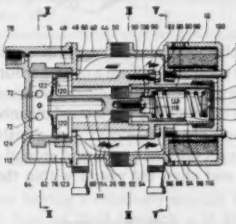
a double-cylindrical front casing (40) comprising inner and outer cylinders has the outer cylinder coupled to the front side of said stator core and the cylinder has a cylindrical front coupling extension (48) formed integrally thereof and coaxially therewith and an inner cylindrical rear coupling extension (50) formed integrally thereof and in axial alignment with said front coupling extension;

means for automatically collimating said front casing with said stator core when the two are coupled to each other;

a front cylinder (62) coupled to said front coupling extension in axial alignment therewith;

a rear cylinder (80) coupled to said rear coupling extension in axial alignment therewith;

said front cylinder, rear coupling extension and rear cylinder define a guiding path for reciprocation of said piston assembly, a piston head (112) axially slidably encased



within said front cylinder, a front piston (114) extending integrally and rearwardly of said piston head, a rear piston (116) coupled to said front piston and axially slidably encased within said rear cylinder and said armature (110) is clamped between said front and rear pistons;

said magnetic poles (22) being placed as close as possible to said guiding path of said piston assembly extending through the wall defining said guiding path,

a rear casing (90) coupled to the rear side of said stator core;

a hollow front end closure (74) coupled to the front end of said front casing defining a cylindrical air reservoir (76) around said front cylinder, said hollow front end closure (74) also defining an air outlet port;

a hollow rear end closure (100) coupled to the rear end of said rear casing in order to define an air intake port;

valve means for permitting air to flow through said electromagnetic fluid operating apparatus from said air intake port to said air outlet port but preventing air flow from said air outlet port to said air inlet port; and

said mechanical biasing means extending into said rear piston.

4,090,817
HIGH DISPLACEMENT-TO-SIZE RATIO ROTARY FLUID MECHANISM

Frederick L. Erickson, 2610 Bosworth Dr., Fort Wayne, Ind. 46805

Filed May 28, 1976, Ser. No. 691,198
Int. Cl.[2] F04B *29/00*
U.S. Cl. 417—462 7 Claims

1. A rotary mechanism comprising:

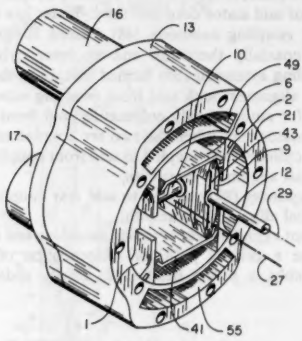
a stationary housing having a general cylindrical interior extending axially between substantially flat generally parallel end portions;

first chamber means rotatable in the housing about the cylinder axis;

a power transfer axis displaced from the cylinder axis;

a piston supported within the cylinder for rotation about the power transfer axis;

second chamber means reciprocable within the rotatable with the first chamber means, said second chamber means defining a chamber for relative reciprocation of said piston;



the first chamber means comprising separate individual portions confined to form a chamber for the second chamber means solely by the housing interior and held apart to form the chamber for the second chamber means solely by the second chamber means; and a piston guide rod slidingly connecting the piston and second chamber means to support and align the piston within the second chamber means.

4,090,818

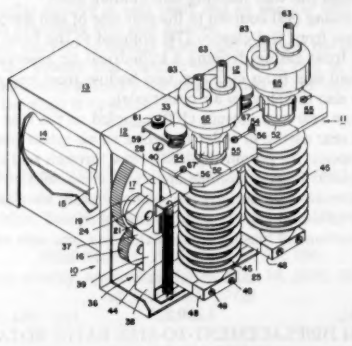
ADJUSTABLE METERING PUMP

Henry F. Hope, and Stephen F. Hope, both of 2421 Wyandotte Rd., Willow Grove, Pa. 19090

Filed May 25, 1976, Ser. No. 689,739

Int. Cl.[2] F04B *45/02, 49/06;* F16J *1/10*

U.S. Cl. 417—473 **24 Claims**



1. A reciprocating positive displacement pump of the type having an expandable chamber operable in a feed stroke direction and in a suction stroke direction comprising:

a frame,

a reciprocating drive mounted on said frame,

a first driven member slidably mounted on said frame for movement in the feed stroke direction by said reciprocating drive,

a second driven member slidably mounted on said frame for movement in the suction stroke direction by said reciprocating drive,

resilient means mounted on said second driven member biasing said second driven member in said feed stroke direction,

an expandable chamber mounted on said frame having an open end and a closed end,

said first driven member being connected to the closed end of said expandable chamber for movement therewith,

said second driven member being coupled to said expandable chamber through said resilient means for causing movement of said expandable chamber in the suction stroke direction,

adjustable stop means for limiting the movement of said first driven member in the suction stroke direction and

said open end of said expandable chamber being adapted to be connected to valve means having an inlet valve which only opens when said closed end of said expandable chamber is operated in the suction stroke direction, said valve means further having an outlet valve which only opens when said closed end of said expandable chamber is operated in the feed stroke direction.

4,090,819

FUEL INJECTION PUMP WITH CAVITATION PREVENTING STEPS ALONG THE FUEL RETURN FLOW PATH

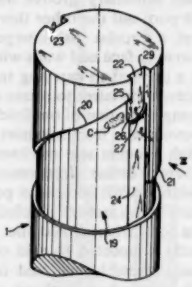
Dirk Bastenhof, Eaubonne, France, assignor to Societe d'Etudes de Machines Thermiques, Saint-Dennis, France

Filed Oct. 28, 1976, Ser. No. 736,570

Claims priority, application France, Nov. 5, 1975, 75 33802; Oct. 15, 1976, 76 31136

Int. Cl.[2] F04B *7/04*

U.S. Cl. 417—499 **4 Claims**



1. A plunger of a constant-stroke, variable delivery rate fuel injection pump for an internal combustion engine, said plunger being of general cylindrical shape with a top end face and being rotatable about its longitudinal center line axis relative to a fixed reference position for cooperating with a pump port to selectively vary the volume of fuel delivered by said pump for each stroke of said plunger in accordance with the relative angular position of said plunger with respect to said fixed reference position, and wherein the plunger includes a peripheral surface having a first outer diameter, and an intermediate portion of reduced cross section that divides the peripheral surface of said plunger into an upper segment terminating at said top end face and a lower segment having the same outer diameter as the upper segment, said plunger including at least one pressure releasing recess having a first predetermined radial depth from the first outer diameter and first and second spaced and parallel sidewalls extending longitudinally from the top end face toward the intermediate portion in a direction parallel to the center line axis of said plunger to define a groove, said first sidewall being longer than said second sidewall, and wherein the upper segment has a helically shaped lower edge portion extending from the lowermost portion of said first sidewall to the lowermost portion of said second sidewall so as to widen said groove beyond the lowermost

portion of said second sidewall in a direction away from said top end face towards said intermediate portion, and wherein the improvement comprises, limiting the predetermined radial depth of said recess to a range of approximately 6% to 2.5% of the first outer diameter, and wherein a part of said recess defined between said first and second sidewalls is radially deeper than the remaining part of said recess so as to define a flow-scattering stepped depression extending longitudinally from said top end face to a level that is adjacent to and closer to the lowermost edge portion of the second sidewall than the lowermost edge portion of the first sidewall.

4,090,820

GEAR PUMP WITH LOW PRESSURE SHAFT LUBRICATION

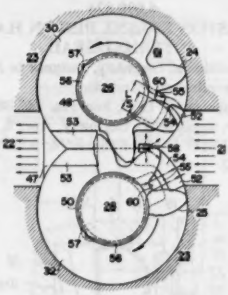
Hideo Teruyama, Ageo, Japan, assignor to Kayabakogyokabushikikaisha, Tokyo, Japan

Filed Jun. 23, 1976, Ser. No. 699,167

Claims priority, application Japan, Jun. 24, 1975, 50-77594; Oct. 11, 1975, 50-138864[U]

Int. Cl.[2] F01C *19/08, 21/04, 21/02, 1/18*

U.S. Cl. 418—1 **12 Claims**



1. A method of lubricating the trunnions and bushings of a gear pump, comprising the steps of

rotating the gears of the gear pump so as to draw liquid into the same through a low-pressure port of the pump, the incoming liquid impinging the bottom of the tooth spaces between the teeth of the gears and changing a pressurized impact flow due to the difference between the flow speed of the incoming liquid and the rotational speed of said gears;

utilizing the kinetic energy of the pressurized liquid so as to channel some of said pressurized liquid into a low-pressure chamber formed in the inner end face of a respective bushing in contact with an axial side face of a respective gear and separated by a wall from a radically outer recess formed in said end face in communication with said low-pressure port and diverting said trapped pressurized liquid into a lubricating groove which distributes the liquid to the respective trunnions and bushings; and

thereafter returning the liquid to said low-pressure port, so that forced lubrication is assured even when said gears rotate at low speed.

4,090,821

GOVERNOR DEVICE

Robert Earl Barrows, Blue Ridge, Va., and Reginald William Pauley, Belle Meade, N.J., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Jun. 29, 1976, Ser. No. 700,863

Int. Cl.[2] F01C *21/12;* **G05D** *13/10*

U.S. Cl. 418—41 **13 Claims**

1. A motor and governor aparatus comprising:

a pressure fluid motor;

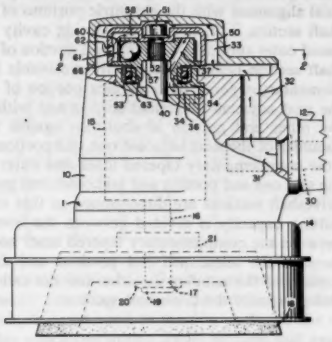
an enclosure rotating in proportion to the speed of said motor;

said enclosure having a radial pressure fluid inlet and a pressure fluid outlet for conducting operating pressure fluid to said motor;

positioning means mounted within said enclosure for rotation with said enclosure;

sealing means disposed at least partially about and rotating with said positioning means;

said sealing means moves by centrifugal force from a position close to said positioning means to a position close to



said enclosure whereby it closes said pressure fluid inlet to said enclosure and obstructs the flow of pressure fluid to said motor;

said sealing means having a relatively smooth face adapted to restrict the flow of fluid through said pressure fluid inlet when moved towards said pressure fluid inlet in a direction which presents said face generally at right angles to the flow of fluid through said pressure fluid inlet; and

said sealing means including centrifugally-operated means operative to urge said sealing means towards said pressure fluid inlet in response to an increase in rotary speed of said enclosure.

4,090,822

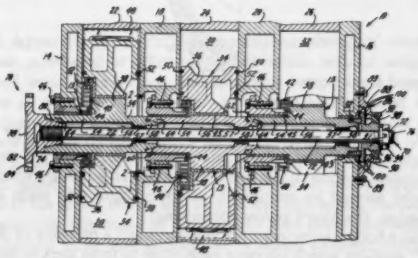
MULTI-SECTIONAL DRIVESHAFT FOR A ROTARY PISTON MECHANISM

Robert E. Mount, Mendham, and Michael T. Gavrun, Bayonne, both of N.J., assignors to Curtiss-Wright Corporation, Wood-Ridge, N.J.

Filed Jan. 28, 1977, Ser. No. 763,348

Int. Cl.[2] F01C *21/00, 1/02;* **F16B** *2/00;* **B16C** *3/12*

U.S. Cl. 418—60 **6 Claims**



1. In a rotary piston mechanism having a plurality of units each of which consists of a piston and a housing forming a cavity in which the piston is supported for planetary movement, a multi-sectional driveshaft comprising:

(a) a plurality of driveshaft sections, one for each unit;

(b) each driveshaft section comprising:

(b-1) an elongated body having an axial bore therethrough and an eccentric portion between the opposite end portions thereof for supporting a piston;

(b-2) one end portion having a tapered outer surface extending from the end of the one end portion and terminating in an annular shoulder extending in a plane substantially normal to the axial bore;

(b-3) the other end portion having a portion of the inner surface of the axial bore adjacent thereto tapered and of a size complementary to said tapered outer surface of said one end portion;

(c) said plurality of driveshaft sections being disposed in axial alignment with the eccentric portions of each driveshaft section in its associated housing cavity and the tapered outer surface of said one end portion of each driveshaft section being telescopically receivable in the complementary tapered inner surface portion of the bore of the next adjacent driveshaft section and with the end of the other end portion in abutment against the annular shoulder of the next adjacent one end portion; and

(d) the complementary tapered inner and outer surfaces of the said one end portion and said other end portion of the driveshaft sections are dimensioned so that torque transmitting capacity is divided between the interference fit between the complementary tapered inner and outer surfaces of the telescoped end portions and the frictional contact of the annular shoulder and the end of said one end portion of the driveshaft sections.

4,090,823

FLUID-COOLED ROTARY PISTON FOR WANKEL-TYPE MECHANISM

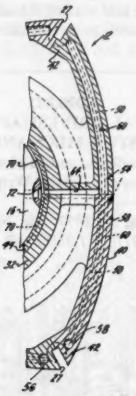
Max Ruf, Obereisesheim, Germany, assignor to Audi NSU Auto Union Aktiengesellschaft, Neckarsulm, Germany

Filed Feb. 17, 1977, Ser. No. 769,573

Claims priority, application Germany, May 15, 1976, 2621720

Int. Cl.[2] F01C *1/02, 21/06, 21/08*

U.S. Cl. 418—94 **5 Claims**



1. A rotary piston for a rotary piston mechanism of the Wankel type wherein said rotary piston is supported on an eccentric portion of a mainshaft for planetary motion within a cavity formed by contiguous peripheral and side walls of a housing, the rotary piston comprising:

(a) a body having opposite side faces and a plurality of flank surfaces which intersect each other to form apex portions;

(b) said body having a central hub portion for supporting the rotary piston on said eccentric portion;

(c) a first seal groove in each apex portion extending between the opposite side faces of the body and radially inward from the intersection of the blank surfaces for receiving therein an apex seal means;

(d) second seal grooves in each side face extending adjacent each flank surface for receiving side seal strips, each groove having a bottom and opposite side walls extending between next adjacent apex portions of the body;

(e) first passages of relatively small flow area extending in the apex portions of said body adjacent each flank surface and in close spaced substantially parallel relation to each of said first seal grooves;

(f) second passages of relatively small flow area extending in said body adjacent each flank surface and extending in close spaced co-extensive relationship with the bottom wall of each of the second seal grooves to communicate at opposite ends thereof with said first passages of the associated flank surface to form for each flank surface a closed-loop passageway;

(g) inlet means in and adjacent one side face of the said body to communicate each of said closed-loop passageways with a source of pressurized cooling fluid to deliver cooling fluid to the latter; and

(h) an outlet means in and adjacent the other side face of said body communicating with each of the closed-loop passageways to carry away heated cooling fluid from the latter.

4,090,824

ROTARY PISTON ENGINE PISTON HAVING AN INTERNAL SEAL

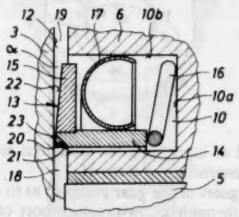
Max Ruf, Obereisesheim, Germany, assignor to Audi NSU Auto Union Aktiengesellschaft, Germany

Filed Apr. 6, 1977, Ser. No. 785,068

Claims priority, application Germany, Apr. 9, 1976, 2615549

Int. Cl.[2] F01C *19/12;* **F16J** *9/16;* **B23P** *15/08*

U.S. Cl. 418—142 **3 Claims**



1. Internal seal for the piston of a rotary piston engine comprising; a slide ring with an annular scraping edge of L-shaped cross-section with an axial flange and a flange extending radially outward, the slide ring including an axially extending ring with one face together with its inner periphery forming the scraping edge, the slide ring including a radially extending ring with its inner periphery shrunk onto the outer periphery of the axial ring near the one face, and the axial ring consisting of material having a smaller coefficient of heat expansion than the radial ring.

4,090,825

PLATE WITH PASSAGES FOR FLUID ROTATIVE MACHINES

Eugeniusz M. Rylewski, 43 bis, Avenue du Gal Leclerc, 78470 St. Remy les Chevreuse, France

Filed Feb. 5, 1976, Ser. No. 655,538

Claims priority, application France, Feb. 7, 1975, 75 03977

Int. Cl.[2] F01C *1/00, 21/00;* **F03C** *3/00;* **F04C** *1/00*

U.S. Cl. 418—178 **12 Claims**

1. In a positive-displacement rotative machine in which the conversion of pressure energy of fluids is obtained by the circulation of at least two spaced vane members in at least one spiral-like passage of revolution defined by rib members having top surfaces and side walls, wherein

said vane members are parts of at least two vane wheels, each of said vane wheels is mounted for rotation about its

own axis and housed in a slot formed in a first part of said machine,

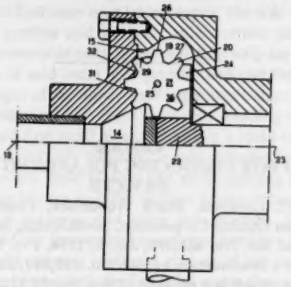
said vane members circulate in said spiral-like passages of revolution formed in a plate member comprising a second part of said machine,

at least one of said first and second parts of said machine is rotatable, the axis of rotation thereof constituting the main axis of rotation of said machine,

the axes of rotation of each of said vane wheels are transverse to said main axis of rotation of said machine,

said spiral-like passages of revolution are generated by a combined rotation of said vane members about the axis of rotation of their respective vane wheels and by rotation of said first part of said machine in relation to said second part of said machine, whereby said side walls of said spiral-like passages have a constantly changing angle of inclination with respect to said main axis of rotation of said machine,

said spiral-like passages are closed across the top surfaces of said rib members by a cooperating surface formed on said first part of said machine receiving said vane wheels in sliding contact therewith to thereby form channels for the circulating fluid, and



said spiral-like passages each extend between a central inlet chamber and a peripheral outlet chamber formed in said plate member for the circulating fluid and have a continuous progressively varying cross-sectional area from the inlet to the outlet thereof,

the improvement therein which comprises:

the width of said vane members at the point of attachment to the body of said vane wheels is greater than the width at the outermost frontal side thereof, and

said spiral-like passages have a transverse section with corresponding dimensions to those of said vane members such that said side walls thereof diverge outwardly from the bottom thereof,

the difference in width of said vane members between said frontal side and said point of attachment to the body of the vane wheel being sufficiently great such that for all different angles of inclination of said side walls of said spiral-like passages on said plate member there is at no point a negative rake with respect to a line parallel to said main axis of rotation of said machine;

whereby said plate member in which said spiral-like passages are formed may be die-cast with a one piece die.

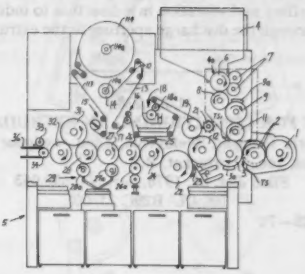
4,090,826

METHOD AND APPARATUS FOR PERFORATING THE WRAPPERS OF ROD-SHAPED SMOKERS PRODUCTS

Alfred Hinzmann, Richmond, Va., assignor to Hauni-Werke Korber & Co. KG, Hamburg, Germany

Filed Oct. 26, 1976, Ser. No. 735,166
Int. Cl.[2] A24C *5/30*; A24F *13/00*
U.S. Cl. 131—23 R **19 Claims**

1. Apparatus for perforating the wrappers of cigarettes or analogous rod-shaped articles having predetermined diameters and constituting or forming part of rod-shaped smokers' products, comprising a conveyor member having a first surface arranged to support and advance a series of successive articles sideways along a predetermined path; means for feeding articles into said path; a second member having a second surface adjacent to a portion of said path and being separated from said first surface by a gap having a width which at most equals said diameter so that articles which enter said gap are caused to roll during travel with said conveyor member; a plurality of perfo-



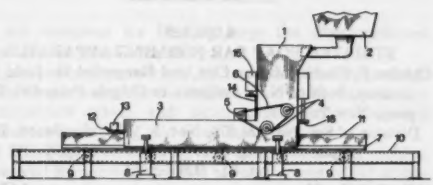
rating elements mounted in one of said members, at least some of said elements extending beyond the surface of said one member to penetrate into and to thereby perforate the wrappers of articles which roll during travel through said gap; and means for changing the combined area of perforations in said wrappers, including means for moving at least one of said perforating elements with respect to said surfaces between at least two different positions in each of which the articles rolling during travel through said gap are perforated.

4,090,827

APPARATUS FOR MOULDING AND EXTRUSION

Ronald Leslie Attwell, Dorchester on Thames, England, assignor to London Brick Buildings Limited, England

Filed Sep. 2, 1975, Ser. No. 609,498
Int. Cl.[2] B28B *1/08*
U.S. Cl. 425—64 **12 Claims**



1. Apparatus for extruding a material consisting of comminuted, powdered or other particulate solids, with or without added liquid, on a surface, said apparatus comprising a hopper open at the upper end thereof to receive said material and having a peripheral wall which at the lower end thereof encloses an area on said surface on which, in use, material from said hopper is deposited and retained within said peripheral wall; means defining a discharge aperture in said peripheral wall at the lower end of said hopper through which discharge aperture, in use, material enclosed by said peripheral wall is discharged from said hopper; an extrusion chamber integral with said hopper and extending laterally from the discharge aperture defining means and communicating with the discharge aperture, said extrusion chamber bounded by top and side walls and defining with said surface a tubular passage having an open delivery end remote from the discharge aperture and through which the material delivered by the hopper and through the extrusion chamber is to be extruded; means to

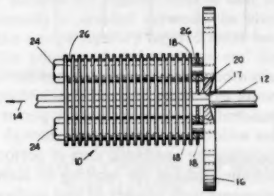
enable relative movement to be effected between the extrusion chamber and the surface in the direction of the intended extrusion through the extrusion chamber and a mechanical vibrator within said hopper, the vibrator comprising a rotatable shaft resiliently mounted at its ends within the hopper at a position therein in which, during use of the apparatus, the shaft will be immersed in the material in the hopper; an eccentric weight on said shaft and means to rotate said shaft to effect vibration of said shaft and hence of the material in the hopper, the axis of rotation of said shaft extending transversely to the intended direction of flow to the discharge aperture of material in the hopper to effect said vibration in a direction to induce flow of material through the discharge aperture to the extrusion chamber.

4,090,828

DIE FOR CONDITIONING AN EXTRUDATE

Charles Gwin Renegar, Shelbyville, Tenn., assignor to Hasbro Industries, Inc., Pawtucket, R.I.

Filed Jan. 21, 1976, Ser. No. 650,963
Int. Cl.[2] B29C *25/00*
U.S. Cl. 425—71 **15 Claims**



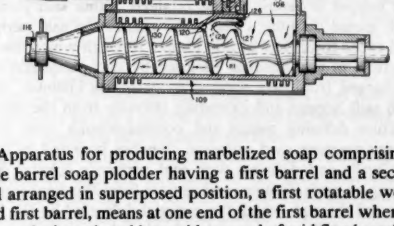
1. A die for conditioning an extrudate comprising:
(a) a mounting plate having an orifice for receiving an extrudate;
(b) a plurality of die members each having an aperture, the die members being composites of a pair of metallic discs; and
(c) means mounting the die members on the mounting plate in cascade relationship so that the members are axially spaced and the apertures are in alignment with the orifice in the mounting plate.

4,090,829

STRIATED SOAP BAR FORMING APPARATUS

Charles F. Fischer, Jersey City, and Hargovind H. Joshi, Piscataway, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Division of Ser. No. 521,070, Nov. 5, 1974, abandoned. This application Aug. 3, 1976, Ser. No. 711,299
Int. Cl.[2] B29F *3/12*
U.S. Cl. 425—73 **4 Claims**



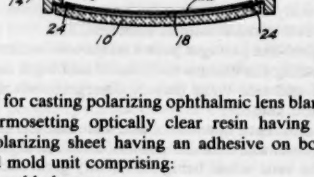
1. Apparatus for producing marbelized soap comprising a double barrel soap plodder having a first barrel and a second barrel arranged in superposed position, a first rotatable worm in said first barrel, means at one end of the first barrel whereby soap may be introduced into said one end of said first barrel for working by said first worm, a vacuum chamber at the other end of said first barrel, means at said other end of said first barrel for discharging soap worked by said first worm in the form of soap pellets into said vacuum chamber, a second rotatable worm in said second barrel, said second barrel having a rear portion open to said vacuum chamber to permit said discharged pellets to be directly deposited on the rear end of said second worm and a changing size throat transition portion extending between said rear portion and a smaller diameter forward bore portion closely surrounding the front end of the second worm, means disposed above said second worm for dripping liquid dye directly onto the surface of the mass of soap being worked by said second worm within said second barrel, said dye dripping means being so located that the dye is applied to the surface of the soap being worked by the second worm within said throat transition portion of the second barrel, said dye dripping means comprising conduit means terminating in an offset dye discharging opening located a predetermined distance transversely of a vertical plane passing through the second worm axis and above the upsweep side of a worm flight, and nozzle means in the forward end of said bore portion at the other end of said second barrel for discharging the soap as an extruded column.

4,090,830

MOLD FOR PRODUCING POLARIZING OPTICAL DEVICES

Norman U. Laliberte, South Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.

Division of Ser. No. 485,398, Jul. 3, 1974, Pat. No. 3,970,362, which is a continuation of Ser. No. 219,847, Jan. 21, 1972, abandoned, which is a division of Ser. No. 35,132, May 6, 1970, Pat. No. 3,674,587. This application Jul. 19, 1976, Ser. No. 706,724
Int. Cl.[2] B29C *5/00*; B29D *11/00*
U.S. Cl. 425—117 **4 Claims**



1. A mold for casting polarizing ophthalmic lens blanks from a fluid, thermosetting optically clear resin having molded therein a polarizing sheet having an adhesive on both sides thereof, said mold unit comprising:
a convex mold element;
a concave mold element;
a peripheral gasket means disposed around the perimeters of said convex and concave mold elements so as to hold said elements in spaced relation;
tab means adapted to be attached to said sheet for positioning said sheet within said peripheral gasket and spaced intermediate said convex and said concave mold elements so as to define first and second molding compartments between said sheet and said convex and said concave mold elements;
tab receiving means disposed on said gasket, said tab and tab receiving means cooperating to provide a resin flow passage communicating between said molding compartments whereby both of said compartments may be filled with resin by a single injection of resin into one of said compartments.

4,090,831

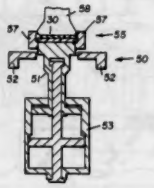
APPARATUS FOR INJECTION OF A SOLE OF TWO MOLDABLE MATERIALS FOR AN ARTICLE OF FOOTWEAR

Ladislav Hujik, Batawa, Canada, assignor to Bata Shoe Co., Inc., Belcamp, Md.

Continuation of Ser. No. 485,888, Jul. 5, 1975, abandoned, which is a division of Ser. No. 291,605, Sep. 25, 1972, abandoned. This application Dec. 20, 1976, Ser. No. 752,122

Int. Cl.[2] B29F *1/12*

U.S. Cl. 425—119 5 Claims



1. An apparatus for forming a sole of two moldable materials for an article of footwear on a lasted upper, the sole including an outer sole portion and an inner sole portion defining an insole on said outer sole portion and a foxing strip surrounding the side edges of said outer sole portion and overlapping the bottom side edges of the upper, said apparatus comprising first mold means defining a first mold cavity for molding said outer sole portion, said first mold means including a mold cylinder, a mold piston reciprocably mounted in said cylinder for vertical movement between mold closing and mold opening positions, said mold piston having an outer surface with substantially the same peripheral shape as said outer sole portion, first mold sides, and a mold top for vertical movement between said mold closing and mold opening positions, said mold top including a bottom surface having substantially the same shape as a last bottom, whereby the first mold cavity is formed for receiving a first moldable material for molding said outer sole portion onto said mold piston; and a second mold means for defining a second mold cavity for molding said inner sole portion; said second mold means including said mold piston and said outer sole portion, second mold sides laterally movable between mold closing and mold opening positions, and a lasted upper vertically movable between mold closing and mold opening positions, said outer sole portion, second mold sides and lasted upper defining the second mold cavity above and surrounding the side edges of said outer sole portion for forming an insole on said outer sole portion and a foxing strip surrounding the side edges of the outer sole portion and overlapping the bottom side edges of the upper.

4,090,832

APPARATUS FOR MAKING SLIDE FASTENER

George B. Moertel, Conneautville, Pa., assignor to Textron Inc., Providence, R.I.

Division of Ser. No. 596,109, Jul. 16, 1975, Pat. No. 4,034,056, which is a division of Ser. No. 380,323, Jul. 18, 1973, Pat. No. 3,906,595. This application Jan. 26, 1977, Ser. No. 762,596

Int. Cl.[2] B29C *17/02*

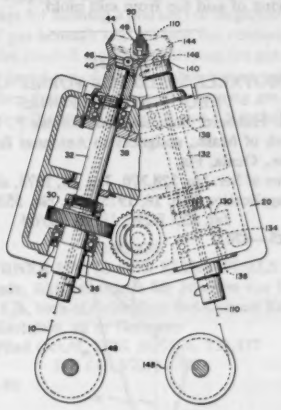
U.S. Cl. 425—391 8 Claims

1. Apparatus for forming a pair of coils for a slide fastener device comprising

a pair of rotatable coiling heads for oppositely rotating a pair of filaments having generally elliptical cross sections,

a mandrel operatively associated with said coiling heads about which the filaments are wound,

a plurality of inclined, filament engaging surfaces rectangularly disposed on said mandrel for shaping the filaments into intermeshed coils, and



one of said surfaces being asymmetrical relative to the other surfaces whereby the intermeshed coils are formed with an asymmetrical pattern.

4,090,833

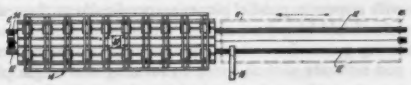
APPARATUS FOR FORMING LARGE REINFORCED FOAMED PLASTIC PANELS

Glen E. W. Saidla, Hampton Falls, N.H., assignor to Exxon Research & Engineering Co., Linden, N.J.

Division of Ser. No. 554,681, Mar. 3, 1975, Pat. No. 4,036,923. This application Feb. 9, 1977, Ser. No. 767,064

Int. Cl.[2] B29C *3/02;* B29D *27/00*

U.S. Cl. 425—451 2 Claims



1. An apparatus for forming large flat fiber-reinforced foamed plastic panel comprising:

(a) an openly disposed mold having a raised boundary edge defining a cavity therein, said mold moveably mounted for horizontal travel and means operatively connected thereto for moving said mold horizontally;

(b) filling means for filling said mold while said mold is moved horizontally by said moving means of (a) with a foamable mixture having fibers intermixed therein;

(c) a press means adapted to receive said mold filled by the filling means of (b) during horizontal movement and thereafter to close said mold by placing a top thereon, said press means including a sequentially operated plurality of operators for placing said top on said mold after said mold is horizontally transported into said press means and beginning first at one corner of the end of the mold first transported into said press means and continuing diagonally toward the opposite end thereof whereby trapping of air thereunder is prevented;

(d) top removal means for lifting said mold top subsequent to the foaming and setting of said foamable mixture of (b) therein, said top removal means including a sequentially operated plurality of operators for raising said top from contact with said mold beginning at one corner of said mold and continuing diagonally to the opposite end thereof to progressively peel the top from said mold, thereby progressively breaking the surface tension and admitting air between said mold and said mold top; and

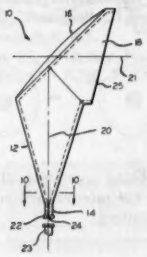
(e) a programmed sequencing mechanism connected to said operators whereby said operators are programmed sequentially and activated to accomplish the placing and removing of said top from said mold.

4,090,834

REMOVABLE MOLD FOR FORMING HIGH FREQUENCY ANTENNAS

Howard H. Hubbard, Scituate, and Thomas P. Walsh, Marshfield, both of Mass., assignors to Antennas for Communications, Inc., Ocala, Fla.

Continuation of Ser. No. 328,370, Jan. 31, 1973, abandoned. This application Feb. 18, 1975, Ser. No. 550,574
Int. Cl.[2] B29C *13/00, 13/04*
U.S. Cl. 425—470 **33 Claims**



1. A mold apparatus for forming a single piece horn-antenna, said antenna having a horn portion and a reflector portion, said mold comprising:

a reflector section for forming said reflector portion of the antenna, said reflector section including a cylindrical part having a convex outer surface;

a horn part having a base end and an upper end, said upper end having a larger cross-sectional area than said base end with respect to parallel planes perpendicular to the central axis of said horn part; and

securing means for removably attaching said horn part to said reflector section, prior to forming said single piece antenna, said securing means being detachable for removing said reflector section and said horn part from the formed antenna.

4,090,835

APPARATUS FOR APPLYING AN ELASTOMERIC EDGE TO A SHEET OF ELASTOMERIC FABRIC

Wright Bronson, Jr., Akron; Thomas Ashworth, Jr., Stow; Ralph Frederick Kiemer, and Gail William Hausch, both of Akron, all of Ohio, assignors to The Steelastic Company, Akron, Ohio

Continuation-in-part of Ser. No. 691,636, Jun. 1, 1976, abandoned. This application Sep. 14, 1976, Ser. No. 723,197
Int. Cl.[2] B29C *17/02*
U.S. Cl. 425—505 **5 Claims**

1. Apparatus for applying an elastomeric material against at least one longitudinal lateral edge portion of a sheet of fabric, said apparatus comprising:

a frame;

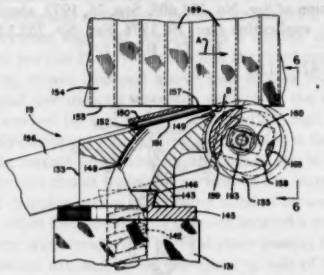
means mounted on said frame to support a moving piece of fabric;

at least one extruder assembly mounted on said frame and including:

a semi-cylindrical throat which tapers to an outlet port capable of being located laterally adjacent such a lateral edge of the fabric sheet to which the elastomeric material is to be applied; and

a forming edge extending a substantial distance along and within said throat and terminating at said outlet port to form an internal, substantially C-shaped, surface on the extrudate emanating from said outlet port into the atmosphere; and,

a wheel mounted in proximity to said extruder outlet port to force such an extrudate against such a lateral edge of the fabric whereby said internal surface envelopes the upper, lower and side of such a lateral edge;



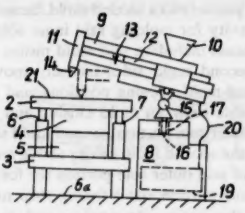
said wheel presenting a forming surface by which to impart an external surface to the extrudate, said forming surface on said wheel being positioned dimensionally closer to the edge of the fabric than the dimension of the extrudate passing therebetween.

4,090,836

INJECTION DIE CASTING APPARATUS, ESPECIALLY FOR MAKING MOLDED PARTS OF THERMOPLAST-STRUCTURAL FOAM

Walter von der Ohe, and Hans-Jürgen Lange, both of Essen, Germany, assignors to Fried. KRUPP Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed Apr. 4, 1977, Ser. No. 784,252
Claims priority, application Germany, Apr. 6, 1976, 2614707
Int. Cl.[2] B29F *1/02*
U.S. Cl. 425—574 **4 Claims**

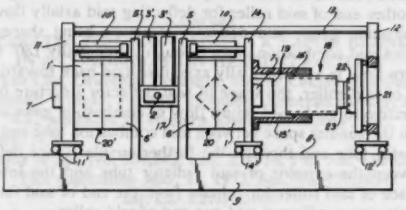


1. An injection die casting apparatus, especially for producing formed articles of thermoplast-structural foam, which includes: at least two closing units arranged adjacent to each other and respectively provided with mold chucking plates adapted to receive and support molds; an injection unit comprising an extruder with a charging hopper mounted thereon and a deflecting head connected thereto and a hydraulic accummulator operative therewith, said closing units having upper surfaces with centrally arranged injection openings respectively; supporting means arranged laterally of said at least two closing units, first bearing means supported by said supporting means and supporting said injection unit for rotation about a vertical axis, second bearing means associated with said first bearing means and supporting said injection unit for pivotal movement of the latter about a horizontal axis, and means operatively associated with said mold chucking plates for moving said mold chucking plates toward and away from each other in a vertical direction substantially parallel to said first mentioned vertical axis.

4,090,837
MACHINE FOR MOLDING MATERIALS WITH A LONG SOLIDIFICATION TIME, SUCH AS STRUCTURAL FOAMS

Angel Tonchev Balevski; Ivan Dimov Nikolov, and Dragan Iliev Nenov, all of Sofia, Bulgaria, assignors to Institute po Metaloznanie i Technologia na Metalite, Sofia, Bulgaria

Filed Jan. 19, 1977, Ser. No. 760,503
Int. Cl.² B29F 1/022
U.S. Cl. 425—588 5 Claims

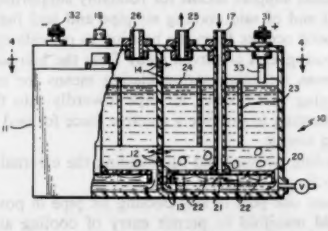


1. An injection molding machine for materials having a long solidification time, comprising:
a base;
support means on said base;
a first stationary mold portion on said support means;
a first plate movable on said base;
a first movable mold portion on said first plate and forming with said first stationary mold portion a first mold cavity in a closed position thereof;
a second stationary mold portion on said support means;
a second plate movable on said base;
a second movable mold portion on said second plate and forming with said second stationary mold portion a second mold cavity in a closed position thereof;
a third plate connected to said first plate and movable therewith in fixed spaced relationship on said base;
a locking mechanism between said second plate and said third plate for biasing said second and third plates in opposite directions when said first and second mold cavities are formed;
a distributor between and communicating with said first mold cavity and said second mold cavity;
a first injection cylinder on said distributor and feeding said first mold cavity therethrough;
a second injection cylinder on said distributor and feeding said second mold cavity therethrough; and
a feed screw barrel communicating through said distributor with said first injection cylinder and said second injection cylinder for the charging thereof with moldable material.

4,090,838
CATALYST GENERATOR

Kenneth R. Schena, Silvermine Rd., West Boxford, Mass. 01855, and Michael Selley, Merrimack, N.H., assignors to Kenneth R. Schena, Haverhill, Mass.

Filed Mar. 17, 1976, Ser. No. 667,877
Int. Cl.² F23J 7/00
U.S. Cl. 431—4 11 Claims

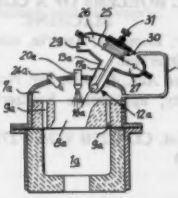


1. Apparatus for improving the efficiency of combustion in a combustion device, comprising chamber means for holding a liquid, supply conduit means extending beneath the surface of said liquid for supplying a gas to a point beneath said surface, distributor means for forming a plurality of large, slowly growing bubbles of gas beneath said surface for contact with said liquid, and outlet conduit means for carrying the gas which has contacted said liquid out of said chamber means; said distributor means further comprising means for forming gas bubbles of the average size of between about 0.4 and 1.5 inches in diameter.

4,090,839
BURNER UNITS FOR FLUID FUELS

Robert von Linde, Akilindastrasse 56; Joachim von Linde, Akilindastrasse 52b, both of Gräfelfing, and German Kurz, Südenstrasse 31, Karlsfeld, all of Germany

Filed Oct. 7, 1976, Ser. No. 730,317
Int. Cl.² F23N 3/02
U.S. Cl. 431—89 11 Claims



1. A burner unit comprising combustion chamber means, prechamber means, means to enable combustion gases to recirculate from said combustion chamber means into said prechamber means, mixing chamber means in communication with said prechamber means and said combustion chamber means, a fuel supply nozzle for distributing fuel into said recirculated combustion gases, said fuel nozzle being associated with control means for varying the fuel supplied thereto, and means including an air nozzle for supplying air to the mixture of fuel and combustion gases, with the energy of the air jet emerging from the air nozzle forming at least partially the means for recirculating the combustion gases, wherein the means for supplying air include means for supplying a variable volume of air under pressure to said air nozzle and means for varying the cross-sectional area of said air nozzle in dependence on the volume of air passing therethrough such that the cross-sectional area of the air nozzle decreases when the volume of air decreases.

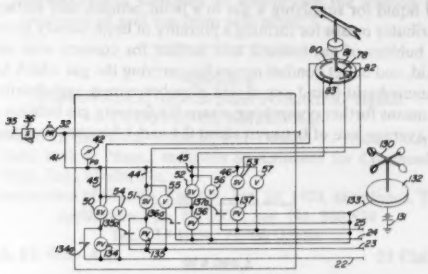
4,090,840
MULTI-PILOT GAS CONSERVATION SYSTEM FOR FLARE BURNERS

John F. Straitz, III, Meadowbrook, Pa., assignor to Combustion Unlimited Incorporated, Elkins Park, Pa.

Filed May 11, 1977, Ser. No. 796,016
Int. Cl.² F23N 5/18
U.S. Cl. 431—14 16 Claims

1. A control system for the pilots of a waste combustible gas flare burner having a plurality of pilots which comprises
a connection to a supply of pilot gas,
a plurality of spaced pilots for said flare burner connected to said supply connection, and
means for controlling the supply of pilot gas to said pilots comprising

a wind direction responsive member contiguous to said flare burner, and



valve members for each of said pilots controlled by the positioning of said wind direction responsive member.

4,090,841

EQUIPMENT FOR THE HEATING OF HOLLOW CYLINDRICAL ROLLERS OF A CORRUGATED PAPER MACHINE

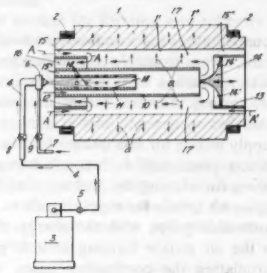
Karl Kramlehner, Rumlang, Austria, assignor to Asitrade AG, Grenchen, Switzerland

Filed Aug. 4, 1976, Ser. No. 711,665

Claims priority, application Switzerland, Aug. 14, 1975, 574010/75

Int. Cl.[2] F27B 9/28; F27D 3/00

U.S. Cl. 432—60 **8 Claims**



1. In a corrugated paper making machine of the type having a plurality of heated, hollow cylindrical rollers fabricated of metal, each of said rollers being mounted for rotation in bearings adjacent the opposing ends of said roller respectively, an improved structure for heating the exterior surface of each of said rollers comprising an elongated metallic combustion tube extending into the interior of said hollow roller from one end of said roller in the axial direction of said roller, said combustion tube being comparatively widely spaced from the interior surface of said hollow roller, the walls of said combustion tube defining a plurality of air inlet perforations therein, an elongated imperforate metallic radiator tube extending into the interior of said roller from said one end of said roller in the axial direction of said roller, the exterior surface of said radiator tube also being spaced from the interior surface of said roller, said radiator tube being disposed in surrounding spaced relation to said combustion tube to define an annular region between the interior of said radiator tube and the exterior of said combustion tube, a liquefied gas jet burner located outside of said hollow roller adjacent said one end thereof and including a nozzle directed toward the interior of said combustion tube at said one end of said roller, means adjacent said one end of said roller for supplying auxiliary air to said annular region and thence via said air inlet perforations to the interior of said combustion tube to effect more complete combustion of liquefied gas from said jet burner within said combustion tube, the heat from said combustion tube being transmitted in a radial direction primarily by radiation to said surrounding radiator tube and being transmitted in a radial direction primarily by radiation from said radiation tube to the interior surface of said hollow roller and then being transmitted through the body of said roller in a radial direction by conduction from the interior surface of said hollow roller to the exterior surface of said roller, the combustion gases within said combustion tube flowing in the axial direction of said combustion tube toward the end of said combustion tube remote from said one end of said roller, a deflector structure disposed within said roller adjacent the other end of said roller for deflecting said axially flowing combustion gases, said deflector structure being shaped to deflect said combustion gases through substantially 180° for a return flow in a substantially axial direction back toward one end of said roller, the shape of said deflector structure being operative to guide said return flow of combustion gases away from the annular space between said combustion tube and said radiator tube and through the further annular space defined between the exterior of said radiator tube and the interior surface of said roller for exhaust from the end of said further annular space adjacent said one end of said roller.

4,090,842

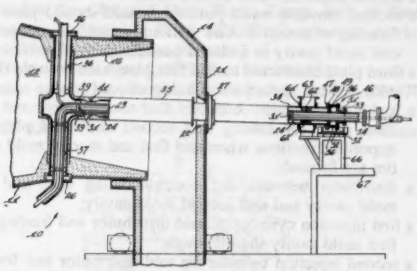
SUPPORT FOR REDUCTION KILN GAS-ON SYSTEM INDEPENDENTLY OF FIRING HOOD

Eugene F. Rossi, Wauwatosa, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Dec. 21, 1976, Ser. No. 753,014

Int. Cl.[2] F27B 7/24

U.S. Cl. 432—115 **1 Claim**



1. In a fluid delivery system for an axial end of a rotary kiln having a housing surrounding the end;

a cooling air pipe extending into the kiln through the housing which surrounds the end thereof;

sealing means sealing the space between the cooling air pipe and the opening in the housing through which said cooling air pipe extends to prevent the uncontrolled entry of air into said kiln;

at least one fuel pipe within said cooling air pipe extending into the kiln;

means supporting the inner end of said fuel pipe within said cooling air pipe;

rotatable support means for rotatably supporting the external end of said cooling air pipe and said fuel pipe positioned remote from the housing to provide space for the housing as it is moved away from the kiln said rotatable means including spring biasing means for continuously urging said cooling air pipe inwardly into the kiln and operating to provide a reactive force for said spring biasing means;

a cooling air manifold surrounding the external end of said cooling air pipe;

at least one port in said cooling air pipe in position within said manifold to permit entry of cooling air from said manifold into the interior of said cooling air pipe;

a common carrying structure located remote from the end of said housing for operatively carrying said cooling air manifold and said rotatable support in axially spaced-apart relationship;

a fuel pipe within said cooling air pipe and extending outwardly of the external end of said cooling pipe; and,

a seal operable to seal the external end of said cooling air pipe from which said fuel pipe extends to prevent leakage of cooling air therefrom.

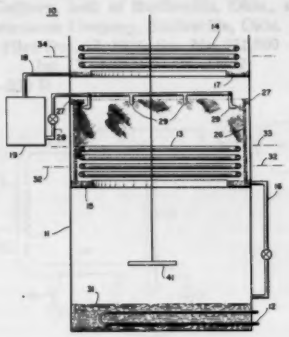
4,090,843

APPARATUS FOR MAINTAINING A VAPOR BLANKET IN A CONDENSATION HEATING FACILITY

Tze Yao Chu, Lawrence Township, Mercer County, and George Michael Wenger, Franklin Township, Somerset County, both of N.J., assignors to Western Electric Company, Inc., New York, N.Y.

Division of Ser. No. 654,242, Feb. 2, 1976, Pat. No. 4,055,217.
This application Mar. 14, 1977, Ser. No. 777,195
Int. Cl.[2] F27B *15/00*
U.S. Cl. 432—197 **5 Claims**

1. A condensation heating facility having a vessel, open to the atmosphere, to receive therein a body of hot saturated primary vapor with a body of secondary vapor interposed between the atmosphere and the primary vapor, comprising:



means for transporting a secondary liquid through the secondary body of vapor and into the body of hot saturated vapor to vaporize the secondary liquid to supplement and maintain the secondary body of vapor.

4,090,844

PROCESS OF PRODUCING HIGH PERFORMANCE DURABLE-PRESS COTTON

Stanley P. Rowland, New Orleans, La., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Jun. 23, 1977, Ser. No. 809,356
Int. Cl.[2] D06M *13/24*
U.S. Cl. 8—120 6 Claims

1. A process for imparting a plurality of useful properties to cellulosic fabrics, said properties including wrinkle resistance, soil release, improved breaking strength and abrasion, and durable deodorant (bacteriostatic) quality to textile garments, the process comprising:

(a) impregnating cotton or other cellulose containing fabric with an aqueous solution containing

(1) at least one water-soluble polyfunctional crosslinking compound having a methylol group,

(2) at least one zinc-containing compound, the salt of a polymerizable acrylic-type acid, and

(3) at least one water-soluble basic persulfate initiator;

(b) subjecting the impregnated fabric to a heat-fixation treatment, and

(c) curing the fabric of (b).

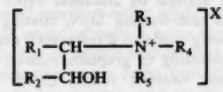
4,090,845

PROCESS FOR THE DYEING OF POLYACRYLONITRILE FIBROUS MATERIAL

Manfred Petzold; Heinz Grunert; Wolfgang Rupilius, all of Dusseldorf, and Horst Rutzen, Langenfeld, all of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Dusseldorf-Holthausen, Germany

Filed Dec. 15, 1976, Ser. No. 750,727
Claims priority, application Germany, Dec. 15, 1975, 2556376
Int. Cl.[2] D06P *5/04;* C07C *85/00*
U.S. Cl. 8—169 19 Claims

1. In the dyeing of a fibrous material having a content of an anionic polyacrylonitrile fiber, wherein said material is contacted with an aqueous dye bath containing a cationic dye and said dye is substantively absorbed by said fiber, the improvement which comprises providing said bath with a content as retardant for the dyeing and as levelling agent for said dye of a water-soluble quaternary ammonium salt of the formula:



wherein R^1 and R^2 each represent alkyl groups of C_{1-15} chain length wherein the sum of the carbon atoms in said groups is 9 to 18; R^3 represents a C_{1-15} alkyl or hydroxyalkyl group; R^4 represents a C_{1-5} alkyl, a C_{1-5} hydroxylakyl or a benzyl group; R^5 represents a benzyl group; and X represents a salt-forming anion.

4,090,846

INDIRECT LATEX TEST FOR DETERMINATION OF FIBRINOGEN DEGRADATION PRODUCTS

Francis Fremonte Buck, Suffern, N.Y., assignor to Fisher Scientific Company, Pittsburgh, Pa.

Filed Oct. 20, 1976, Ser. No. 734,217
Int. Cl.[2] G01N *33/16*
U.S. Cl. 23—230 B 2 Claims

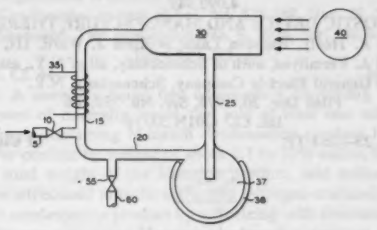
1. A method for the determination of fibrinogen degradation products in a sample of human serum or urine which comprises mixing a sample of said serum or urine with antiserum to the D and E fragments of human fibrinogen; and adding a FDP-latex reagent containing the D and E fragmens of human fibrinogen chemically coupled to latex particles to said mixture.

4,090,847

DETERMINING FIRE RETARDANCY

Ralph S. Becker, Houston, Tex.; Roger W. Fenstermaker, and Jack P. Guillory, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 17, 1976, Ser. No. 751,500
Int. Cl.[2] G01N *21/26, 23/12*
U.S. Cl. 23—230 R 13 Claims



1. A method for testing flame retarding ability of a composition which comprises:

(a) producing in a reaction zone hot hydrogen radicals;

(b) allowing hot hydrogen radicals to combine forming hydrogen molecules;

(c) measuring the amount of hydrogen molecules formed in step (b);

(d) repeating steps (a)–(b) under the same conditions but in the presence of the composition in gaseous state in the reaction zone; and

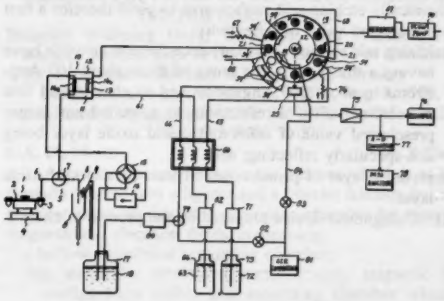
(e) determining the differrence between the amount of hydrogen molecules measured in step (c) and a corresponding part of step (d).

4,090,848

AUTOMATIC ANALYZING APPARATUS

Toyohiko Naono, Tokyo, Japan, assignor to Nihon Denshi Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 15, 1976, Ser. No. 666,921
Claims priority, application Japan, Mar. 20, 1975, 50-33683
Int. Cl.[2] G01N *33/16, 1/14*
U.S. Cl. 23—253 R 9 Claims



1. An automatic analyzing apparatus comprising a rotatable reaction device in which a plurality of reaction tubes are circumferentially spaced, said reaction tubes having upper and lower ports, fixed upper and lower changeover valve blocks having passages that may be brought into registry with the upper and lower ports of said reaction tubes, means for irradiating reaction tubes and the contents thereof at at least one rotary position of the reaction device and means for detecting the amount of light passed through said reaction tube, whereby said reaction tubes may be connected sequentially to receive metered sample and reagents, to receive mixing gases, to ex-

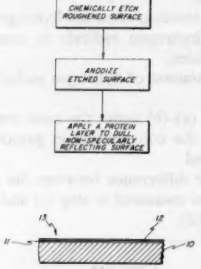
haust the contents of said tubes and to receive abluents for cleaning said tubes as the rotatable reaction device is stepwise rotated.

4,090,849

DIAGNOSTIC DEVICE AND MANUFACTURE THEREOF

William A. Healy, Ballston Lake; William J. Ward, III, and David A. Vermilyea, both of Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 20, 1976, Ser. No. 752,186
Int. Cl.[2] G01N *33/16*
U.S. Cl. 23—253 TP **11 Claims**



1. A process for the production of a diagnostic device useful for detecting the presence or absence of select biological particles in a liquid sample comprising the steps of:

roughening surface area on a bulk metal substrate to render said surface area non-specularly reflecting, the metal having the property of enabling the formation of a tenacious oxide layer on the surface thereof;

chemically etching said surface area to yield therefor a first preselected value of reflectivity;

oxidizing said surface area to produce thereon an oxide layer having a thickness in the range of from about 100 Angstroms to about 500 Angstroms and to change said first preselected value of reflectivity to a second and larger preselected value of reflectivity, said oxide layer being non-specularly reflecting; and

applying a layer of protein over at least part of said oxide layer.

11. A diagnostic device prepared by the process of claim 1.

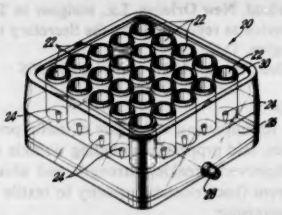
4,090,850

APPARATUS FOR USE IN RADIOIMMUNOASSAYS

Ching-Hong Chen, North Brunswick; Horng-Mou Tsay, East Brunswick, and Robert E. Heyer, Hopatcong, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Nov. 1, 1976, Ser. No. 737,250
Int. Cl.[2] G01N *33/16, 23/00;* A61K *43/00*
U.S. Cl. 23—259 **5 Claims**

1. Apparatus for use in a radioimmunoassay test procedure comprising a receptacle tray having multiple wells, each of said wells having at its bottom an orifice of such size and shape as to retain the liquids used in the radioimmunoassay under given pressure conditions and permit the evacuation of said liquids through said orifices at reduced pressure, and structure



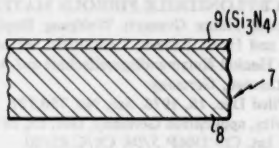
adapted to surround the outlets of said orifices with an environment of reduced pressure.

4,090,851

SI_3N_4 COATED CRUCIBLE AND DIE MEANS FOR GROWING SINGLE CRYSTALLINE SILICON SHEETS

Samuel Berkman, Florham Park; Kyong-Min Kim, East Windsor, and Harold Edgar Temple, Trenton, all of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Oct. 15, 1976, Ser. No. 732,865
Int. Cl.[2] B01J *17/18;* C01B *33/02*
U.S. Cl. 23—273 SP **2 Claims**



1. In an apparatus for growing single crystal thin sheets of silicon by seed pulling from a melt contained in a crucible through a forming die comprising a crucible for molten silicon and a die for shaping the growing crystal extending into contact with the melt, the improvement which comprises coating the surfaces of said crucible and said die which come in contact with said silicon melt with a protective layer of pyrolitic silicon nitride applied by chemical vapor deposition to form a non-porous non-wetting Si_3N_4 coating thereon, said crucible and die being made of a refractory material selected from the group consisting of graphite, quartz, boron nitride, ceramic-bonded and sintered silicon nitride compositions, molybdemum, tantalum, and tungsten, said refractory material having a thermal coefficient of expansion about the same as that of Si_3N_4, said Si_3N_4 coating having an average thickness of between about 25×10^{-4} and 25×10^{-3} cm.

4,090,852

GAS FLOW PERVIOUS SUPPORT AND RETAINING STRUCTURE FOR PARTICULATE MATERIAL

Edward J. Dowd, Palatine, Ill., assignor to Air Resources, Inc., Palatine, Ill.

Filed Dec. 23, 1976, Ser. No. 754,020
Int. Cl.[2] B01J *8/44*
U.S. Cl. 23—288 F **3 Claims**

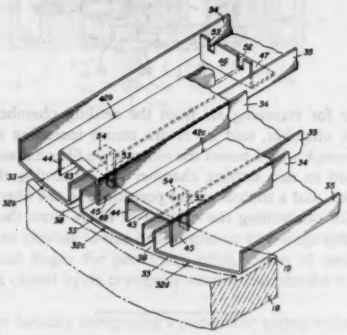
1. A reactor for incinerating fumes and waste gases containing combustible noxious materials, said reactor comprising:

an elongated, vertically extending housing having upper and lower ends and a generally cylindrical side wall, said side wall having an inwardly extending circumferential ledge at an elevation intermediate the ends of said housing,

a catalyst support structure engaging said ledge and extending across the interior of said housing to divide said housing into upper and lower zones, said catalyst support structure being adapted to receive and support a bed of

particulate catalyst material in either a quiescent, agitated or fluidized state and comprising a first set of elongated channel members mounted in parallel, laterally spaced relation, the channel members of said first set having gaps therebetween and being arranged with their webs extending generally horizontally and their flanges extending upwardly from the webs, the ends of said channels resting on said ledge,

a second set of elongated channel members mounted in parallel laterally spaced relation above said first set of channel members, the channel members of said second set also having gaps therebetween and being arranged with their webs extending generally horizontally and with their flanges extending downwardly from the webs, the webs of said second set of channel members being horizontally offset with respect to the webs of said first set so as to



overlie the gaps between said first set of channel members, and

partition means comprising a plurality of vertically elongated plate members located within the gaps between the members of said first set of channel members and adjacent the ends thereof, said plate members extending transversely across said gaps and vertically between the webs of said second set of channel members and said ledge,

whereby said catalyst support structure prevents particulate catalyst from falling through the gaps between said first set of channel members either when said reactor is operating and gas under pressure is being supplied to said lower zone to fluidize or agitate said catalyst or when said reactor is inoperative or gas under pressure is not being supplied to said lower zone, said structure also serving to uniformly distribute gas through said catalyst when said reactor is operating.

4,090,853

COLLOIL PRODUCT AND METHOD

Eric J. Clayfield, Mickle Trafford, near Chester; Ernest C. Lumb, Chester, and Kenneth J. Wilbraham, Upton-by-Chester, all of England, assignors to Shell Oil Company, Houston, Tex.

Filed Oct. 26, 1976, Ser. No. 735,360

Claims priority, application United Kingdom, Oct. 29, 1975, 44639/75

Int. Cl.[2] C10L *1/32*

U.S. Cl. 44—51 **5 Claims**

1. A method of making a fluid fuel product containing coal and a liquid hydrocarbon fuel comprising, mixing coal of a grain size not greater than about 6 mm. with an amount of water not greater than thirty percent by weight, based on the weight of the coal; mixing the wetted coal with liquid hydrocarbon fuel, the amount of coal being controlled so that the mixture contains not more than fifty percent by weight of coal, based on the weight of the coal and fuel; and milling the mixture thus formed to produced a fluid fuel containing coal particles not greater than about 500 microns in size.

4,090,854

SULFURIZED MANNICH CONDENSATION PRODUCTS AND FUEL COMPOSITIONS CONTAINING SAME

Kirk Emerson Davis, Euclid, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Continuation-in-part of Ser. No. 528,189, Nov. 29, 1974, abandoned. This application Feb. 9, 1976, Ser. No. 656,228

Int. Cl.[2] C10L *1/22*

U.S. Cl. 44—73 **16 Claims**

1. A normally liquid fuel composition containing a major amount of normally liquid fuel and at least one sulfurized, nitrogen-containing Mannich condensation product having a sulfur content by weight of about 0.1 to 20% sulfur, based on the total weight of the Mannich product, said sulfur having been introduced into the sulfurized, nitrogen-containing Mannich condensation product by sulfurizing with elemental sulfur a nitrogen-containing Mannich condensation product useful as an additive for normally liquid fuels, and said nitrogen-containing Mannich condensation product being made from at least one phenol bearing a hydrocarbon-based substituent of about 6 to about 400 carbon atoms, at least one aldehyde and at least one amino or polyamino compound having at least one NH group.

3. An additive concentrate for the treatment of normally liquid fuels containing an inert solvent/diluent and about 20 to about 90% of at least one sulfurized, nitrogen-containing Mannich condensation product having a sulfur content by weight of about 0.1 to 20% sulfur, based on the total weight of the Mannich product, said sulfur having been introduced into the sulfurized, nitrogen-containing Mannich condensation product by sulfurizing with elemental sulfur a nitrogen-containing Mannich condensation product useful as an additive for normally liquid fuels, and said nitrogen-containing Mannich condensation product being made from at least one phenol bearing a hydrocarbon-based substituent of about 6 to about 400 carbon atoms, at least one aldehyde and at least one amino or polyamino compound having at least one NH group.

4,090,855

METHOD AND APPARATUS FOR SEPARATION OF GASEOUS PARTICLES OF DIFFERENT MASSES BY CENTRIFUGAL FORCES

Heinrich Wolfgang Hora, Ottobrunn, and Friedbert Hans Karger, Munich, both of Germany, assignors to Gesellschaft für Kernverfahrenstechnik m.b.H., Jülich, Germany

Continuation-in-part of Ser. No. 69,514, Aug. 6, 1970, abandoned. This application Dec. 21, 1973, Ser. No. 425,236

Int. Cl.[2] B03C *1/00*

U.S. Cl. 55—2 **8 Claims**

1. Apparatus for separating a gas mixture which is at least partially ionized into a lighter and a heavier fraction by rapid rotation about an axis of a separating chamber by means of magnetic and electrical fields, comprising:

a hollow cylindrical separating chamber;

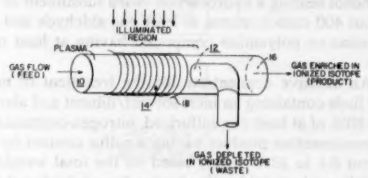
first means for producing a closed static magnetic field configuration within said separating chamber which is rotationally symmetrical about the longitudinal axis of said chamber, said first means including a hollow cylindrical electrical coil mounted within said separating chamber and disposed coaxially about said longitudinal axis of said chamber, a direct current source being connected to said coil, an auxiliary coil arrangement coaxially arranged with said separating chamber and extending along the outer surface of the longitudinally extending wall thereof, and direct current source means connected to said auxiliary coil arrangement for supplying a current thereto which flows in the direction which is opposite to the direction of the current through said hollow cylindrical electrical coil; and

second means for producing a plasma of the gas mixture along said longitudinal axis within said separating chamber and for producing an electrical field within said separating chamber whose field lines lie in planes containing said longitudinal axis, said second means including a first arc electrode mounted on one end of said cylindrical coil and along said longitudinal axis, a second arc electrode disposed within said separating chamber on the end wall of said separating chamber which faces said first arc electrode, said second arc electrode being opposite and axially aligned with said first arc electrode, and voltage source means for applying a potential across said first and second arc electrodes.

4,090,856
PROCESS FOR ISOTOPE SEPARATION EMPLOYING CATAPHORESIS

Gerald L. Rogoff, Pittsburgh, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 25, 1975, Ser. No. 599,210
Int. Cl.² B03C 1/00
U.S. Cl. 55—11 **14 Claims**



1. A method for separating a gas enriched in a preselected isotope out of a gaseous mixture including the preselected isotope comprising the steps of:

at least partially confining the gaseous mixture within a bounded container;

selectively ionizing the preselected isotope within the gaseous mixture to create a plasma with substantially no ionization of the remaining gaseous mixture other than the preselected isotope;

establishing an ion density of the preselected isotope within the plasma within the central region of the container sufficient to cause ambipolar diffusion of the ions of the preselected isotope to the boundary of the container;

separating the gas enriched in the preselected isotope substantially adjacent to the boundary of the container from the gas within the central region of the container; and

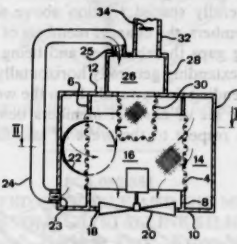
removing from the container, respectively, the gas depleted of the ionized isotope from the central region of the container and the gas enriched in the ionized isotope adjacent the boundary of the container.

4,090,857
FILTER BOX FOR TEXTILE MACHINES, ESPECIALLY A SPINNING MACHINE

Johann Walter Ferri, and Hanspeter Sutter, both of Uster, Switzerland, assignors to Luwa AG, Zurich, Switzerland

Filed Aug. 20, 1976, Ser. No. 716,173
Claims priority, application Switzerland, Aug. 25, 1975, 10942/75
Int. Cl.² B01D 50/00
U.S. Cl. 55—337 **6 Claims**

1. A filter box for textile machines, especially spinning machines, comprising a box, a substantially cylindrical first filter arranged within the box and subdividing said box into a raw air chamber and a clean air chamber, means defining a respective raw air inlet opening and a fiber outlet opening connected to the raw air chamber, means providing a clean air outlet opening connected to said clean air chamber, a ventilator having a suction side connected to the clean air outlet opening, said raw air chamber having a substantially hollow cylindrical configuration and an inner wall, said first filter forming at least a part of the inner wall of the raw air chamber, the raw air inlet opening extending approximately tangentially with respect to the inner wall of the raw air chamber to produce a spin flow in the raw air chamber, a fiber settling chamber connected to the fiber outlet opening of the raw air chamber, air return means connected between the fiber settling chamber and the clean air

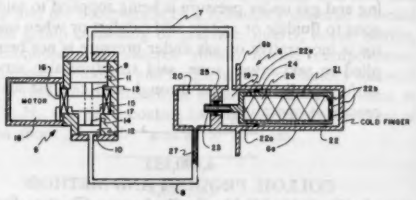


chamber for returning air from the settling chamber to the clean air chamber, said air return means including a second filter through which passes the return air, a fiber exhaust means connected to said settling chamber for exhausting the fibers therefrom, and a shutoff means positioned in the fiber exhaust means for controlling the exhaust of fibers from the settling chamber.

4,090,858
TWO-STAGE SPLIT-CYCLE COOLER WITH PNEUMATIC PISTON

Charles M. Hanson, Springfield, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 28, 1977, Ser. No. 773,032
Int. Cl.² F25B 9/00
U.S. Cl. 62—6 **2 Claims**



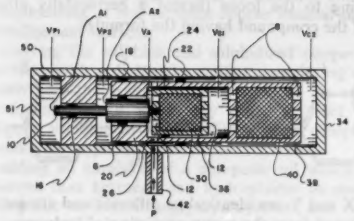
1. A two-stage split-cycle mechanical cooler having a compression portion, a distinct expansion portion, and conduit means between said portions: said compression portion including a first piston in a first cylinder and a second piston in a second cylinder, and means for reciprocally moving said pistons in said cylinders in phase opposition; said expansion portion including a third cylinder having distinct first and second spaces, a third piston in said third cylinder having opposite ends respectively in said first and second spaces, and a regenerator in said end of said third cylinder which is in said first space of said third cylinder; and said conduit means including first and second conduits respectively connecting said first cylinder to said first space and said second cylinder to said second space, wherein said second conduit includes a regenerator therein.

4,090,859

DUAL-DISPLACER TWO-STAGE SPLIT CYCLE COOLER

Charles M. Hanson, Springfield, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 23, 1977, Ser. No. 780,375
Int. Cl.[2] F25B *9/00*
U.S. Cl. 62—6 4 Claims



1. A free moving in-line dual-displacer two-stage split cycle cooler cold finger for providing refrigeration of small heat loads in a closed cycle cryogenic cooler, said device comprising:

a cooler housing comprising a pneumatic spring volume end isolated by seals from a cold end and further comprising a working volume having an inlet port in a center portion that is connected by a closed system of working fluid to a remote compressor means for providing alternate high and low pressure waves in said working fluid to said cold end; and

a dual-displacer in said cold end comprised of a first stage regenerator-displacer having internal heat storage means with accessible pores thereto and a first stage pneumatic piston at the working volume end that moveably extends through said seals into said pneumatic spring volume end and a second stage regenerator-displacer having internal heat storage means with accessible pores thereto and a second stage pneumatic piston that encloses said first stage regenerator-displacer and moveably extends through said seals into said pneumatic spring volume end in which a precooled volume is established between said first stage and second stage regenerator-displacers and a cold volume is established between said second stage regenerator-displacer and said cold end wherein the average pressure of said alternating pressure waves in said working fluid is equal to the average pressure in said pneumatic spring volume end wherein said high pressure waves expand said precooled volume prior to expanding said cold volume due to the larger differential pressure in said high pressure waves than the pressure in said pneumatic spring volume and said low pressure waves cause compression of said precooled volume prior to compression of said cold volume due to the larger differential pressure in said pneumatic spring volume than the low pressure waves wherein more total heat is transferred from said cold end by removing heat to both of said first and second stage internal heat storage means during the higher work input of said high pressure waves than is transferred back to said precooled and cold volumes during the low work input low pressure waves of said alternating pressure waves to provide said free moving in-line dual-displacer two-stage split cycle cooler cold finger at said cold end.

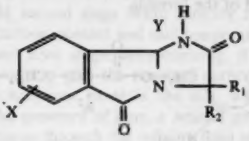
4,090,860

METHOD FOR INHIBITING BUD GROWTH OF PLANTS

Saleh Abdul-Kadir Ashkar, Madison, Wis., assignor to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 631,359, Nov. 12, 1975, Pat. No. 4,067,718. This application Sep. 9, 1977, Ser. No. 831,837
Int. Cl.[2] A01N *9/22*
U.S. Cl. 71—78 11 Claims

1. A method for inhibiting bud growth on plants comprising, contacting the plants with a bud growth inhibiting amount of a compound of the formula:



wherein X represents H, CH_3, OCH_3, SCH_3 or NO_2; R_1 is alkyl C_1–C_4, benzyl or cyclopropyl; R_2 is alkyl C_1–C_4, provided that the sum of the carbon atoms in the groups represented by R_1 and R_2 is 3 to 7, and when R_1 and R_2 are taken together with the carbon atom to which they are attached, they may represent cycloalkyl C_5–C_6 optionally substituted with methyl; Y is hydrogen, methyl, alkoxy C_1–C_3, methylthio or mercapto; and the optical and stereoisomers thereof.

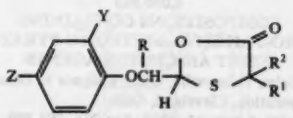
4,090,861

HERBICIDAL 1,3-OXATHIOLAN-5-ONES

Kurt H. G. Pilgram, Modesto, Calif., assignor to Shell Oil Company, Houston, Tex.

Division of Ser. No. 645,598, Dec. 31, 1975, Pat. No. 4,019,892. This application Nov. 4, 1976, Ser. No. 738,795
Int. Cl.[2] C07D *327/04;* A01N *9/12*
U.S. Cl. 71—90 7 Claims

1. A compound of the formula



wherein Y is hydrogen, halogen of atomic number 9–35, inclusive, cyano, alkyl, alkoxy or alkylthio of 1 to 6 carbon atoms each optionally substituted by one or more halogen atoms, Z is hydrogen, halogen of atomic number 9–35, inclusive, alkyl or alkoxy of 1 to 6 carbon atoms optionally substituted by one or more halogen atoms; R^1 and R^2 each independently is hydrogen, alkyl of 1 to 6 carbon atoms or aryl or aralkyl of up to 8 carbon atoms; R^3 is hydrogen or alkyl of 1 to 6 carbon atoms and R is hydrogen or methyl.

6. A method for controlling undesirable plant growth which comprises applying to the locus to be protected a herbicidally effective amount of a compound as claimed in claim 1 or a composition thereof.

7. A herbicidal composition comprises a compound as claimed in claim 1 and at least one surface active agent or carrier therefor.

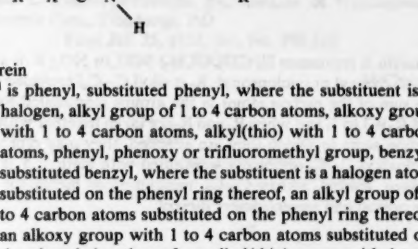
4,090,862

NOVEL PHENOXYCARBOXYLIC ACID ARYLOXY(THIO)CARBONYLAMINOMETHYL ESTERS AND THEIR USE FOR REGULATING PLANT GROWTH

Rudolf Thomas, Wuppertal, and Klaus Lürssen, Bergisch-Gladbach, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Dec. 22, 1976, Ser. No. 753,407
Claims priority, application Germany, Jan. 15, 1976, 2601376
Int. Cl.[2] A01N *9/12, 9/24;* C07C *69/76, 153/07*
U.S. Cl. 71—98 22 Claims

1. Phenoxycarboxylic acid aryloxy carbonylaminomethyl ester compound of the formula



(I)

wherein

R^1 is phenyl, substituted phenyl, where the substituent is a halogen, alkyl group of 1 to 4 carbon atoms, alkoxy group with 1 to 4 carbon atoms, alkyl(thio) with 1 to 4 carbon atoms, phenyl, phenoxy or trifluoromethyl group, benzyl, substituted benzyl, where the substituent is a halogen atom substituted on the phenyl ring thereof, an alkyl group of 1 to 4 carbon atoms substituted on the phenyl ring thereof, an alkoxy group with 1 to 4 carbon atoms substituted on the phenyl ring thereof, an alkyl(thio) group with 1 to 4 carbon atoms substituted on the phenyl group thereof, a phenyl, phenoxy or trifluoromethyl group substituted on the phenyl ring thereof, naphthyl or substituted naphthyl where the substituent is 1 or more halogen, alkyl with 1 to 4 carbon atoms, alkoxy with 1 to 4 carbon atoms, alkyl(thio) with 1 to 4 carbon atoms, phenyl, phenoxy or trifluoromethyl group,

R^2 is hydrogen or alkyl of from 1 to 4 carbon atoms,

R^3 is phenyl or substituted phenyl, where the substituent is 1 or more halogen, straight or branch chain alkyl with 1 to 4 carbon atoms, alkoxy with 1 or 2 carbon atoms, halogenoalkyl with 1 to 2 carbon atoms, and 1 to 5 halogen atoms nitro or phenoxy which itself can be substituted by fluorine, chlorine, bromine or nitro,

X is oxygen, and

n is 0, 1 or 2.

4,090,863

COMPOSITIONS CONTAINING 5-CHLORO-3-METHYL-4-NITRO-1H-PYRAZOLE AS FRUIT ABSCISSION AGENTS

Robert E. Holm, Painesville, Ohio, assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Aug. 11, 1975, Ser. No. 603,290
Int. Cl.[2] A01N *9/22, 9/20*
U.S. Cl. 71—92 5 Claims

1. A composition capable of promoting fruit abscission which composition consists essentially of 5-chloro-3-methyl-4-nitro-1H-pyrazole and tetrachloroisophthalonitrile wherein the amount of said 5-chloro-3-methyl-4-nitro-1H-pyrazole in said composition is not in excess of about 300 ppm.

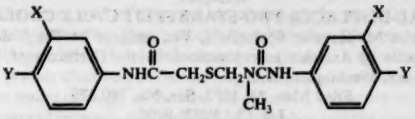
4,090,864

HERBICIDAL ACETAMIDOTHIOMETHYL UREAS

Arnold D. Gutman, Berkeley, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

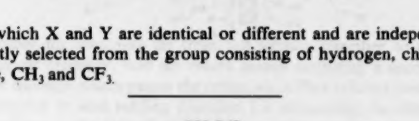
Filed May 31, 1977, Ser. No. 801,890
Int. Cl.[2] A01N *9/12;* C07C *127/15*
U.S. Cl. 71—98 27 Claims

1. A compound having the formula



in which X and Y are identical or different and are independently selected from the group consisting of hydrogen, chlorine, CH_3 and CF_3.

19. A method of controlling undesirable vegetation comprising applying to the locus thereof a herbicidally effective amount of the compound having the formula



in which X and Y are identical or different and are independently selected from the group consisting of hydrogen, chlorine, CH_3 and CF_3.

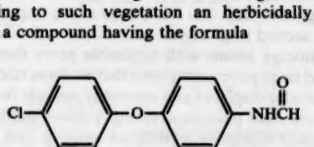
4,090,865

DIPHENYL ETHER AMIDES

Don R. Baker, Orinda, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 598,486, Jul. 23, 1975, Pat. No. 3,976,470.
This application Jun. 14, 1976, Ser. No. 695,357
Int. Cl.[2] A01N *9/20*
U.S. Cl. 71—118 4 Claims

1. A compound having the formula



2. A method of controlling undesirable vegetation comprising applying to such vegetation an herbicidally effective amount of a compound having the formula

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4,090,866

PROCESS FOR THE SELECTIVE CONTROL OF TALL FESCUE IN TURF

James Almy Simmons; George Edson Wood, and Paul Leroy Jacquemin, all of Marysville, Ohio, assignors to O. M. Scott & Sons Company, New York, N.Y.

Filed Mar. 14, 1977, Ser. No. 777,136
Int. Cl.[2] A01N *9/24*
U.S. Cl. 71—108 8 Claims

1. A process for the selective control of tall fescue and perennial ryegrass in Kentucky bluegrass, fine fescue or bentgrass turf comprising treating said turf with a compound selected form the group consisting of (a) 4-(4'-chlorophenoxy)-phenoxy-d-propionic-isobutylester and (b) methyl 2-[4-(2,4-dichlorophenoxy)-phenoxy]propanoate, in an amount effective to kill said tall fescue or perennial ryegrass but insufficient to damage said turf.

4,090,867

FLOTATION OF NON-SULPHIDE COPPER ORES

George W. Poling, Vancouver, Canada, and Jorge E. Rosas, Santiago, Chile, assignors to Canadian Patents & Development Limited, Ottawa, Canada

Filed Apr. 28, 1976, Ser. No. 681,065
Claims priority, application Canada, Apr. 30, 1975, 225926
Int. Cl.[2] B03D *1/02;* B22B *15/00*
U.S. Cl. 75—2 8 Claims

1. A process for beneficiation of copper ores which are at least partially in non-sulphide form and which include one or more of the copper minerals malachite, chalcopyrite, cuprite, brochantite, chalcocite and bornite, by flotation, comprising

(a) sulphidizing of non-sulphide copper mineral surfaces to stabilize said surfaces;

(b) reacting the sulphide and sulphidized copper mineral surfaces with a diphenylguanidine complexing agent selective for the copper sulphide surfaces the amount of complexing agent being only added to react with the copper sulphide to render said surfaces oleophilic and weakly hydrophobic,

(c) adding an emulsion of a non-polar oil which is more viscous than kerosene and hydrophobic to render said oleophilic surfaces strongly hydrophobic, and

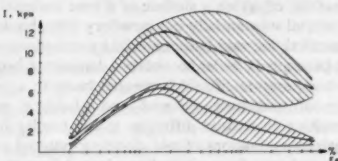
(d) concentrating by flotation the hydrophobic copper sulphide minerals away from the non-floated gangue, and recovering the concentrate.

4,090,868

PHOSPHORUS STEEL POWDER AND A METHOD OF MANUFACTURING THE SAME

Jan Robert Tengzelius, Oxelvagen 37, 260 40, Viken; Per Folke Lindskog, Langgatan 21, and Lars-Erik Svensson, Mollebacken 8, both of, 263 00 Hoganas, all of Sweden

Filed Oct. 26, 1976, Ser. No. 735,132
Int. Cl.[2] B22F *1/00*
U.S. Cl. 75—0.5 R 17 Claims



1. A phosphorus steel powder for manufacturing sintered mouldings having high toughness, consisting of a steel powder substantially free from phosphorus and having a good compressability, which is intimately mixtured with ferrophosphorus powder having a phosphorus content exceeding 2.8 weight-%, in such an amount that the phosphorus content of the mixture is 0.2 to 1.5%, wherein the total content of impurities which are at the sintering temperature more easily oxidized than the main components iron and phosphorus does not exceed 4%, and the ferrophosphorus powder has a maximum particle size of 20 μm.

4,090,869

PROCESS OF MANUFACTURING ALLOY STEELS IN A CONTINUOUSLY CHARGED ARC FURNACE

Lucien Antoine, Parc Dorian, 42490 Fraisses; Pierre Leroy, 23 rue de Tourville, 78100 Saint-Germain-en-Laye, and Jean Saleil, 11 rue Lougansk, 42100 Saint-Etienne, all of France

Filed Mar. 4, 1977, Ser. No. 774,606
Claims priority, application France, Apr. 7, 1976, 76 10062
Int. Cl.[2] C21C *5/52*
U.S. Cl. 75—12 9 Claims

1. A process of manufacturing an alloy steel, selected from the group consisting of chrome steels and manganese steels from a granulated ferro-alloy in an electric arc furnace provided with means for continuously charging the furnace with solid materials in divided form and means for injecting a refining fluid into the furnace, said process comprising;

in a first stage, bringing the initial charge to the molten state;

in a second stage, continuously adding the ferro-alloy to the molten charge while simultaneously blowing the refining fluid into the charge, the kind of refining fluid and the flow rate thereof being controlled in relation to the power of the arcs such that, throughout said second stage, the molten charge has an optimum carbon content and remains at a substantially constant temperature, the amount of oxidized chromium passing into the slag at any time during said second stage being directly related to said optimum carbon content and said temperature; and

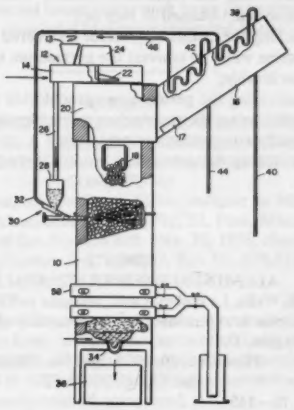
in a third and final stage, decarburizing, if required, the molten charge to give the required carbon content, and reducing chromium oxide in the slag with a reducing agent in the presence of lime, a neutral gas being blown into the charge through the refining fluid injecting means to produce a mixing action wherein at least the first two stages are carried out in the electric arc furnace.

4,090,870

CONTINUOUS SMELTING AND REFINING OF CEMENT COPPER

Douglas Pollock; Omar Sobarzo; Rolando Urquizar; Carlos Vilches, and Jaime Bolanos, all of Santiago, Chile, assignors to Compania de Acero del Pacifico S.A., Santiago, Chile

Division of Ser. No. 700,217, Jun. 28, 1976, Pat. No. 4,056,262.
This application Jan. 12, 1977, Ser. No. 758,570
Int. Cl.[2] C22B *15/00*
U.S. Cl. 75—74 12 Claims



1. The method of refining cement copper comprising:

mixing cement copper with desired fluxes and preheating the mixture;

injecting the mixture with a heated, pressurized gas into incandescent coke in an oxidizing shaft kiln at the level of highest temperature, to effect rapid melting of said mixture without significant dusting losses and the formation of molten metal and slag phases;

injecting an oxidizing gas into said metal phase to drive impurities into said slag;

removing said slag and covering said metal with a reductant;

treating said metal with a reducing agent to produce a copper of high purity; and

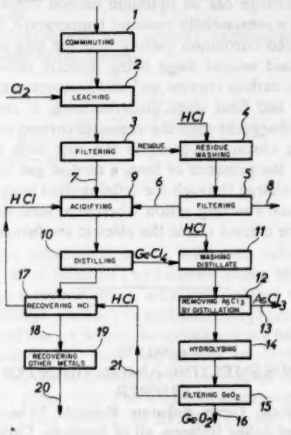
recovering said copper.

4,090,871

PROCESS FOR THE RECOVERY AND PURIFICATION OF GERMANIUM FROM ZINC ORES

Albert Lebleu, Courcelles-les-Lens; Paul Fossi, Elancourt, and Jean-Michel Demarthe, Viroflay, all of France, assignors to Societe Miniere et Metallurgique de Penarroya, Paris, France

Filed Jul. 8, 1976, Ser. No. 703,707
Claims priority, application France, Jul. 8, 1975, 75 21327
Int. Cl.[2] C01G *17/02, 17/04*
U.S. Cl. 75—84.5 40 Claims



1. A process for the recovery of germanium as germanium oxide from germaniferous metallic zinc comprising:

(a) distilling the germaniferous metallic zinc under non-oxidizing conditions;

(b) recovering the distillation residue, which contains the germanium, obtained in step (a);

(c) leaching the distillation residue recovered in step (b) with chlorine water to convert the germanium into germanium tetrachloride;

(d) recovering the germanium tetrachloride from step (c);

(e) hydrolyzing the germanium tetrachloride recovered in step (d) into germanium oxide; and

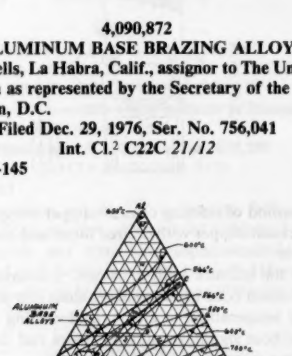
(f) recovering the germanium oxide obtained in step (e).

4,090,872

ALUMINUM BASE BRAZING ALLOY

Robert R. Wells, La Habra, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Dec. 29, 1976, Ser. No. 756,041
Int. Cl.[2] C22C *21/12*
U.S. Cl. 75—145 3 Claims



2. An aluminum base alloy consisting essentially of the following composition:

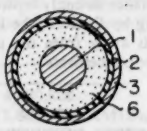
	Percent
copper	25
silver	25
aluminum	balance

4,090,873

PROCESS FOR PRODUCING CLAD METALS

Masayuki Takamura; Aritsune Matsuo, and Kenzaburo Iijima, all of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Shizuoka, Japan

Continuation of Ser. No. 543,504, Jan. 23, 1975, abandoned. This application Jul. 30, 1976, Ser. No. 710,259
Int. Cl.[2] B22F *7/04*
U.S. Cl. 75—208 R 24 Claims



1. Process for producing clad metals comprising, in sequential combination, covering a surface of a base material with a cladding material substantially in a powdery state, binding said cladding material and said base material by compaction under static fluid pressure in order to obtain a laminated body, and raising the temperature of said laminated body to a sintering temperature of said base material and cladding material, thereby resulting in mutual diffusion at the border between said materials, combinations of said cladding material and core material being chosen from a member selected from the group consisting of nickel base alloy with copper, nickel base alloy with aluminum, steel containing carbon with copper, steel containing carbon with aluminum, aluminum with copper, Fe-Ni alloy with copper, magnesium with silver, type 2024 high-strength aluminum alloy with type 6053 corrosion-resistant aluminum alloy, type 5052 aluminum alloy with copper, copper-beryllium alloy with copper, austenite-type stainless steel with cupro-nickel, copper phosphate with silver, copper with nickel, copper with silver, and stainless steel with copper, the core material being the first-mentioned metallic material of each member of the group and the cladding material being the second-mentioned metallic material of each member of the group.

22. A process for producing clad materials comprising, in sequential combination, covering a surface of a metallic base material comprising a nickel-base alloy with a first metallic cladding material comprising copper substantially in a powdery state, binding said first cladding material and said base material by compaction under static fluid pressure in order to obtain a laminated body, raising the temperature of said laminated body to a sintering temperature of said base material and said first cladding material, thereby resulting in mutual diffusion at the border between said materials, covering said thermally treated laminated body with a further metallic cladding material comprising aluminum substantially in a powdered state, binding by compaction under static fluid pressure said further cladding material with said first cladding material in order to obtain a multi-laminated body, and raising the temper-

ature of said multi-laminated body to a sintering temperature of said first cladding material and said further cladding material.

4,090,874

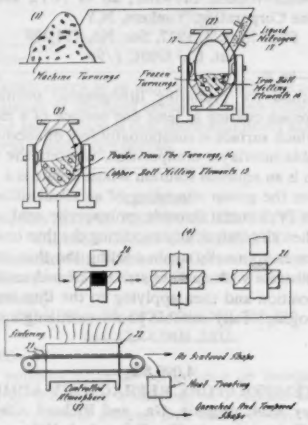
METHOD FOR IMPROVING THE SINTERABILITY OF CRYOGENICALLY-PRODUCED IRON POWDER

Sydney M. Kaufman, Livonia, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 584,564, Jun. 6, 1975, abandoned. This application Jul. 9, 1976, Ser. No. 703,881

Int. Cl.[2] C22C *1/04*; B22F *1/02*

U.S. Cl. 75—246 1 Claim



1. A powder compact consisting essentially of a uniform and homogeneous mixture of ferrous-based first particles having a size range −200+325 mesh and containing oxidizable alloying ingredients including carbon, manganese and chromium and ferrous-based second particles having a size range of −60+140 mesh, one of said first and second particles having a copper envelope about substantially each of the particles thereof, and substantially each of the particles of said first particles having at least one impact stress defect site therein, said compact having a density of between 6.6–6.7 g./cc. and a volume shrinkage of 7–10% upon being heated to 2050° F.

4,090,875

DUCTILE TUNGSTEN-NICKEL-ALLOY AND METHOD FOR MANUFACTURING SAME

Robert L. Ludwig, Kingston, Tenn., assignor to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Oct. 1, 1973, Ser. No. 402,413

Int. Cl.[2] C22C *1/04, 27/04*

U.S. Cl. 75—248 2 Claims

1. A tungsten-base alloy consisting of about 95 weight percent reprocessed tungsten having an oxygen content in the range of about 500 to 2000 ppm, 3.5 weight percent nickel, 1.5 weight percent iron, and a metal selected from the group consisting of niobium and zirconium in a concentration of about 0.05 to 0.5 weight percent for increasing the tensile elongation of the alloy by a factor of at least about 9 over that obtainable without the addition of said metal.

4,090,876

COLOR CORRECTED LATENT ELECTROSTATIC IMAGES FORMED USING ION-BEAM SCREEN, PLURAL EXPOSURES

Tutomu Furuya, Kawasaki, and Shigeru Inowa, Hino, both of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Jul. 13, 1977, Ser. No. 815,152

Claims priority, application Japan, Jul. 19, 1976, 51-84983; Jul. 19, 1976, 51-84984

Int. Cl.[2] G03G *13/22*

U.S. Cl. 96—1 R 9 Claims

1. A process for forming electrostatic latent images comprising steps of electrically charging a photoconductive layer of an ion-beam controlling screen, exposing said photoconductive layer electrically charged to a first image information, disposing a recording medium having a photoconductive layer so as to oppose to the exposed photoconductive layer, applying ions to said photoconductive layer of said recording medium through said screen to form an electrostatic image having a background of charged potential, and exposing said photoconductive layer of said recording medium in which said electrostatic image is formed to a second image information to produce a corrected electrostatic latent image.

3. A process for forming color electrophotographs comprising steps of electrically charging a photoconductive layer of an ion-beam controlling screen, exposing the charged photoconductive layer to one of three separated color images of a color original, disposing a recording medium having a photoconductive layer so as to face said charged photoconductive layer, applying ions to said photoconductive layer of said recording medium through said screen to form an electrostatic image having a background of charged potential, exposing said photoconductive layer of said recording medium in which said electrostatic image is formed to one of the remainder two color separated image informations thereby to form a corrected electrostatic latent image in said recording medium, and developing said corrected latent image with toner corresponding to said one of the remainder two color separated image informations.

4,090,877

PHOTOSENSITIVE IMAGEABLE COMPOSITION CONTAINING A HEXAAROMATICBIMIDAZOLE, A LEUCO DYE AND AN OXYGEN-SENSITIZING COMPOUND

Richard D. Streeper, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 634,619, Nov. 24, 1975, abandoned. This application Aug. 15, 1977, Ser. No. 824,733

Int. Cl.[2] G03C *1/52, 5/04*

U.S. Cl. 96—27 E 25 Claims

1. In an imageable composition of the type including (a) a dye in the leuco form, and (b) a hexaaromaticbiimidazole that, upon exposure to electromagnetic radiation at a wavelength of from about 250 to 400 nanometers, effects a conversion of said dye to a differently colored compound;

the improvement comprising:

including in said composition an oxygen-sensitizing compound which, when exposed to radiation of from 400 to 700 nanometers in the presence of oxygen, brings about the formation of singlet oxygen and exhibits a linear photolysis characteristic wherein said sensitizing compound causes 1,3-diphenylisobenzofuran to disappear linearly and smoothly with a zero order rate plot when a solution comprising 0.125 grams of said oxygen sensitizing compound, 0.01 mole of 1,3-diphenylisobenzofuran and 1 liter of acetone is irradiated with light from two 150 watt flood lamps focused on said solution; wherein said oxygen sensitizing compound is selected from the group consisting of porphyrins, and polycyclic aromatic compounds comprising from 2 to 3 moieties in conjugate relationship as a part of a single chromophore, each of said moieties comprising

three linearly kata condensed, 6-membered carbocycles, an —OZ group being attached to the meso position on each of said moieties, wherein Z is a stable monovalent radical, the —OZ group being a stabilizing group for said polycyclic aromatic compound, wherein at least one auxochromic group comprising an atom having an atomic weight of at least 31 is bonded to said chromophore by means of the atom and wherein said moieties are joined together by means selected from bonding said moieties in the peri fashion and bonding said moieties through a linking moiety selected from the group consisting of (a) atoms which are at least trivalent and are capable of forming covalent bonds, (b) ligands having two or more atoms which are at least bidentate, and (c) covalent single and double bonds;

wherein said oxygen sensitizer is present in an amount such that, upon exposure of said composition to electromagnetic radiation at a wavelength of about 400 to 700 nanometers in the presence of oxygen, said dye is stabilized in the leuco form.

4,090,878

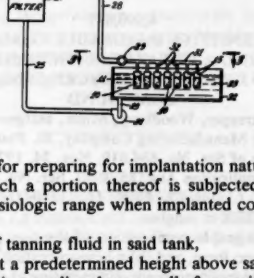
ARRANGEMENT FOR PREPARING NATURAL TISSUE FOR IMPLANTATION

Warren D. Hancock, Newport Beach, and Frederick P. Sattler, Fullerton, both of Calif., assignors to Hancock Laboratories, Inc., Anaheim, Calif.

Division of Ser. No. 665,520, Mar. 10, 1976, Pat. No. 4,050,893, which is a continuation of Ser. No. 490,686, Jul. 22, 1974, abandoned, which is a continuation-in-part of Ser. No. 324,217, Jan. 16, 1973, abandoned, which is a continuation of Ser. No. 28,630, Apr. 15, 1970, abandoned. This application Sep. 22, 1977, Ser. No. 835,522

Int. Cl.[2] C14C *15/00*

U.S. Cl. 69—29 **10 Claims**



1. A device for preparing for implantation natural tissues in a form in which a portion thereof is subjected to pressure within the physiologic range when implanted comprising

a tank,

a quantity of tanning fluid in said tank,

a reservoir at a predetermined height above said tank,

a fluid conduit extending downwardly from said reservoir to a position adjacent said tank,

means at the lower end of said conduit for engaging such tissues in said tank, and additional tanning fluid in said reservoir and said conduit for applying a pressure head to such tissues associated with said means at the end of said conduit for applying a predetermined pressure to such tissues.

4,090,879

DEVELOPING SOLUTIONS FOR 2-COMPONENT DIAZO-TYPE MATERIALS

James K. J. Cheng, Vestal, N.Y., assignor to GAF Corporation, New York, N.Y.

Filed Nov. 15, 1976, Ser. No. 742,055

Int. Cl.[2] G03C *5/34, 1/58*

U.S. Cl. 96—49 **2 Claims**

1. A developer composition for developing a latent image-bearing 2-component diazo-type material consisting essentially of a mixture of N-(2-hydroxyethyl)-ethylenediamine and diethylaminopropylamine present in an amount of about 10–40% by weight of said composition, the former being present in an amount of about 5–40%, and the latter up to 10% by weight, of said composition, the balance being a suitable solvent selected from the group consisting of a glycol ether, a glycol, N-methyl-2-pyrrolidone and water, and mixtures thereof.

2. developer compositon according to claim 1 wherein said mixture contains about 7.5% of N-(2-hydroxyethyl)-ethylenediamine and about 9.5% of diethylaminopropylamine.

4,090,880

LITHOGRAPHIC PRINTING PLATE AND METHOD OF MAKING SAME

Simon Long Chu, Dobbs Ferry; Eugene Golda, Monsey, and Alan Leonard Wilkes, Brewster, all of N.Y., assignors to Polychrome Corporation, Yonkers, N.Y.

Filed Mar. 3, 1977, Ser. No. 774,008

Int. Cl.[2] G03C *1/94*

U.S. Cl. 96—86 R **14 Claims**

1. A method for preparing lithographic printing plates which comprises coating at least one surface of a metal sheet substrate, which surface is substantially free of anodic coating, with a suitable interlayer composition, wherein the interlayer composition is an aqueous solution whose solute is a substance selected from the group consisting of an alkali silicate, silicic acid, Group IV-B metal fluoride, polyacrylic acid, and alkali metal salt, then electrolytically anodizing the thus coated metal sheet substrate, optionally again coating the thus coated and anodized substrate with another stratum of said suitable interlayer composition and then applying to the thus treated substrate a lithographically suitable photosensitizing agent.

4,090,881

HIGH TEMPERATURE REFRACTORY ADHESIVE

David LeRoy Keel, Augusta, Ga., and Richard Allen Waugh, Aiken, S.C., assignors to The Babcock & Wilcox Company, New York, N.Y.

Filed Jun. 30, 1976, Ser. No. 701,256

Int. Cl.[2] C04B *35/14*

U.S. Cl. 106—68 **4 Claims**

1. A zirconium free inorganic refractory adhesive composition which on a dry weight basis consists of 33 to 80% mullite, 10 to 43% ceramic fiber, 5 to 20% alumina, 5 to 20% colloidal silica and 3 to 13% clay suspension agent, the composition upon setting being characterized by its high temperature electrical insulating properties and structural integrity with respect to thermal stresses.

4,090,882

GLASSY CALCIUM SILICATE FIBERS MADE FROM PHOSPHORUS SLAG

Eberhard Rauschenfels, Wiesbaden, Germany, assignor to Dyckerhoff Zementwerke Aktiengesellschaft, Wiesbaden-Amoneburg, Germany

Continuation-in-part of Ser. No. 726,340, Sep. 24, 1976, abandoned, which is a continuation of Ser. No. 584,242, Jun. 5, 1975, abandoned. This application Apr. 6, 1977, Ser. No. 785,251

Claims priority, application Germany, Jun. 8, 1974, 2427770; Mar. 30, 1974, 2318512; Luxembourg, Mar. 28, 1974, 69740; Belgium, Mar. 25, 1974, 142427; Switzerland, Mar. 14, 1974, 3598/74; France, Mar. 22, 1974, 74 09984; Netherlands, Mar. 27, 1974, 7404191

Int. Cl.[2] C03C *13/00*

U.S. Cl. 106—99 **2 Claims**

1. In the production of phosphorus wherein a phosphorus-containing material is electrothermally processed to produce phosphorus and a molten slag, the phosphorus is separated and the molten slag is solidified, the improvement which comprises adjusting the SiO_2 content and adding to the separated slag at

least one modifying oxide selected from the group consisting of ZnO, ZrO_2, Cr_2O_3 and TiO_2 to form a molten mass having the approximate composition

CaO	[10–60] 20–35 by weight
SiO_2	[35–70] 40–60
Al_2O_3	1–10
$ZnO+ZrO_2+Cr_2O_3+TiO_2$	0.1–10
oxide impurities, Fe_2O_3 and Na_2O	<2,

the weight ratio for CaO: SiO_2 being about 1:2, and solidifying said mass by melt spinning and attenuating to form calcium silicate glass fibers.

2. The process of claim 1, wherein

CaO	15–50% by weight
SiO_2	40–65
Al_2O_3	1–10]
$ZnO+ZrO_2+Cr_2O_3+TiO_2$ =	0.5–7 and
oxide impurities =	<1

and an aqueous slurry of an inorganic binder selected from the group consisting of Portland cement, alumina cement, calcium silicate, lime and gypsum is cast about said fibers as a reinforcement to form a building material.

4,090,883

BUILDING MATERIAL REINFORCED WITH FIBERS OF GLASSY CALCIUM SILICATE

Eberhard Rauschenfels, Wiesbaden, Germany, assignor to Dyckerhoff Zementwerke Aktiengesellschaft, Wiesbaden - Amoneburg, Germany

Filed May 23, 1977, Ser. No. 799,892
Int. Cl.² C04B 7/02
U.S. Cl. 106—99 **3 Claims**

1. In a building material comprising an inorganic binder selected from the group consisting of Portland cement, alumina cement, calcium silicate, lime and gypsum, structurally reinforced with glass fibers, the improvement which comprises employing as said glass fibers alkali-resistant calcium silicate glass fibers containing at least one modifying oxide selected from the group consisting of ZnO, $ZrO_2$and Cr_2O_3 said fibers consisting essentially of approximately

CaO	26 – 50 % by weight
SiO_2	40 – 65 %
Al_2O_3	1 – 8
$ZnO+ZrO_2+CrO_3$	0.1 – 10
Fe_2O_3 and Na_2O	< 2

4,090,884

INHIBITORS FOR ALKALI-GLASS REACTIONS IN GLASS FIBER REINFORCED CEMENT PRODUCTS

Friedrich Goeman, Stone Mountain, Ga., assignor to W. R. Bonsal Company, Lilesville, N.C.

Filed Jul. 16, 1976, Ser. No. 705,884
Int. Cl.² C04B 7/02
U.S. Cl. 106—99 **3 Claims**

1. A glass reinforced cement mix suitable for high tensile strength applications such as surface bonding of cement blocks or the like or in the formation of concrete articles and characterized by a resistance to alkali-glass reaction resulting in loss of tensile strength, said cement mix comprising:

	Parts by weight
Portland cement	100
Hydrated lime	0–30
Alkali susceptible E-glass reinforcement elements	2–15
Aggregate filler	0–300
Inhibitor for alkali-aggregate expansion reaction, ASTM-C-441	0–15
Finely divided alkali reactive scavenger material containing at least 65% SiO_2 and comprising 30–325 mesh powdered soda lime glass	1–7

said scavenger material having a reactivity with the alkali content of said Portland cement which is substantially greater than the reactivity of said glass reinforcement elements therewith whereby the alkali content of said Portland cement reacts with said scavenger material in preference to said glass reinforcement element.

4,090,885

METHYL 1,1,3,3-TETRAMETHYL-BUTYL ETHER

James Edward Lyons, Wallingford, Pa., assignor to Suntech, Inc., Wayne, Pa.

Division of Ser. No. 658,435, Feb. 17, 1976. This application May 27, 1977, Ser. No. 801,284
Int. Cl.² C09D 5/02
U.S. Cl. 106—170 **1 Claim**

1. A composition comprising a latex base paint and, as an anti-foam and surface smoothing agent therefor, an effective amount of methyl 1,1,3,3-tetramethyl-butyl ether.

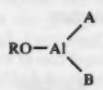
4,090,886

ALUMINUM BASED AIR DRYING COMPOSITIONS

John Harry Wallice Turner, Chapel en le Frith, England, assignor to Manchem Limited, London, England

Continuation-in-part of Ser. No. 434,465, Jan. 18, 1974, abandoned. This application Mar. 1, 1976, Ser. No. 662,553
Int. Cl.² C09D 3/26
U.S. Cl. 106—264 **12 Claims**

1. A storage-stable air drying composition comprising a drying oil resin or ester and a preformed reaction product of a labile monofunctional reactant with an aluminum compound of the formula



wherein R is selected from the group consisting of isopropyl, ethoxyethyl, butoxyethyl and cyclohexyl, and each of A and B is selected from the group consisting of OR, 2-ethylhexonate, 3,5,5-trimethylhexonate, versatate, naphthenate isopropylphthalate, ethoxyethoxylmaleate, ethylacetoacetate and acetylacetonate, said reaction product containing at least one gram mole of said labile monofunctional reactant per gram atom of aluminum in said aluminum compound, wherein said labile monofunctional reactant is selected from the group consisting of lower alkanols having up to about eight carbon atoms, tert.-butyl hydroperoxide, cumenyl hydroperoxide, acetylacetone, ethylacetoacetate, water, hydrogen peroxide, and mixtures thereof.

4,090,887

PIGMENTED MICROPOROUS SILICA MICROSPHERES PRODUCED BY A WATER IN OIL EMULSION

Mark James Marquisee, and Lionel Samuel Sandell, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 25, 1975, Ser. No. 635,060
Int. Cl.[2] C01B 33/12; C09C 1/30
U.S. Cl. 106—288 B 8 Claims

1. Process for preparing pigmented silica microspheres by the steps of

(i) forming a water-in-oil emulsion by contacting a siliceous aqueous phase with an oil phase,

said siliceous aqueous phase consisting of water, particulate pigment, and at least one silicon compound selected from the group consisting of collodial silica and alkali metal silicates,

said oil phase consisting of at least one water-immiscible hydrocarbon selected from the group consisting of liquid and low melting aliphatic, aromatic and chlorinated hydrocarbons and from 0.5% to 15% by weight of a non-ionic water-in-oil emulsifier, based on the total weight of the oil phase,

(ii) adding acid to the water-in-oil emulsion formed in Step (i), the acid being added in an amount from 0.5 to 2.0 times the amount of acid needed to react stoichiometrically with the total amount of base present in the siliceous aqueous phase of Step (i) to gel the siliceous aqueous phase and form a slurry of pigmented silica microspheres, and

(iii) separating the pigmented silica microspheres from the slurry formed in Step (ii).

4,090,888

PRODUCTION OF BLACK IRON OXIDE PIGMENTS

Jakob Rademachers; Franz Hund, both of Krefeld; Ingo Pflugmacher, Meerbusch, and Gerhard Winter, Krefeld, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Apr. 8, 1976, Ser. No. 674,995
Claims priority, application Germany, Apr. 24, 1975, 2518283
Int. Cl.[2] C01G 49/08
U.S. Cl. 106—304 10 Claims

1. In a two-stage process for producing iron oxide black pigment wherein goethite is formed in a first stage, and in a second stage the goethite is suspended in an iron (II)-containing solution, the solution is rendered alkaline to precipitate iron (II) hydroxide or carbonate and the precipitate is reacted to form magnetite, the improvement which comprises effecting the second stage in the presence of an inorganic ionic compound of at least one metal selected from the group consisting of copper, nickel, aluminum, chromium, titanium, zirconium and vanadium in about 0.05 to 5% calculated as metal based on the weight of the final pigment.

4,090,889

FORMING OF HIGH STRENGTH ALUMINUM ALLOY

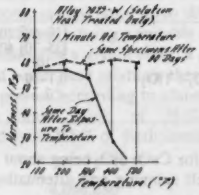
Robert A. George, Detroit, and John Pogorel, Jr., Lincoln Park, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Nov. 12, 1976, Ser. No. 741,255
Int. Cl.[2] C22F 1/04
U.S. Cl. 148—11.5 A 20 Claims

1. The method of forming a high strength aluminum alloy part without substantial loss of alloy strength, comprising the steps:

heating the alloy to an elevated temperature below that at which an initial substantial strength loss will occur and below the alloy recrystallization temperature,

maintaining the alloy at the elevated temperature range for a time less than the time at which any substantial loss of strength occurs, and


Alloy 2024-W (Solution Heat Treated Only)
1 Minute At Temperature
Same Specimens After 30 Days
Same Day After 30 Days Exposure To Temperature
Hardness (Rb)
Temperature (°F)

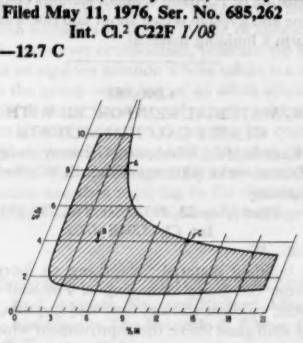
forming the alloy into the part while it is in the heated condition.

4,090,890

METHOD FOR MAKING COPPER-NICKEL-TIN STRIP MATERIAL

John Travis Plewes, Berkeley Heights, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 11, 1976, Ser. No. 685,262
Int. Cl.[2] C22F 1/08
U.S. Cl. 148—12.7 C 5 Claims



1. A method of producing high strength Cu-Ni-Sn strip material from an alloy comprising a composition falling within the shaded area of FIG. 1 and containing not less than 4% Sn CHARACTERIZED IN THAT said ingot is processed by a sequence of steps which terminates in the sequential steps of (1) homogenizing, (2) cold rolling by an amount corresponding to an area reduction of from 25% to 45%, and (3) aging at a temperature in the range of from 250° C to 450° C whereby essentially isotropic formability is obtained.

4,090,891

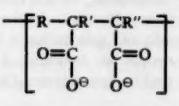
WATER-SOLUBLE POLYMERS DERIVED FROM COPOLYMERIZATION OF DIENE AND MALEIC ACID OR MALEIC ACID DERIVATIVE AND AQUEOUS QUENCHING FLUIDS PREPARED THEREFORE

Kazuyoshi Mitamura, and Hiroyuki Itoh, both of Yokohama, Japan, assignors to Nippon Oil Company Limited, Tokyo, Japan

Filed Feb. 10, 1977, Ser. No. 767,445
Claims priority, application Japan, Feb. 6, 1976, 51-19411
Int. Cl.[2] B23K 35/24
U.S. Cl. 148—28 7 Claims

1. An aqueous quenching fluid consisting essentially of

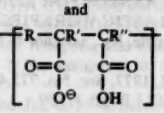
(a) a conjugated diene-maleic acid derivative copolymer containing recurring anionic units represented by the formulae:



(I)

-continued

and



(II)

wherein R represents a conjugated diene unit, R′ and R″, respectively, represent hydrogen, a halogen atom or an organic radical containing from 1 to 18 carbon atoms, and the acid groups are partly or entirely dissociated in such a way that the ratio of (I) to (II) is between 100:0 and 0:100;

(b) at least one cation selected from the group consisting of alkali metal cation, ammonium ion and substituted ammonium ion represented by $R_1R_2R_3R_4N^+$ wherein R_1, R_2, and R_3, and R_4, respectively, are selected from the group consisting of hydrogen, alkyl-, cycloalkyl-, and aryl-groups containing from 1 to 18 carbon atoms, said cation being present in an amount from about 0.5 to about 5.0 equivalents on the basis of the maleic acid derivative unit in component (a);

(c) Mg^{++} in an amount from about 0.3 to about 2.0 equivalents on the basis of the maleic acid derivative unit in component (a); and,

(d) at least one anion capable of forming a water-soluble salt with Mg^{++} or alkali metal ions in an amount from about 0.5 to about 0.7 equivalents on the basis of the maleic acid derivative unit in component (a).

4,090,892

PERMANENT MAGNETIC MATERIAL WHICH CONTAINS RARE EARTH METALS, ESPECIALLY NEODYMIUM, AND COBALT PROCESS FOR ITS PRODUCTION AND ITS USE

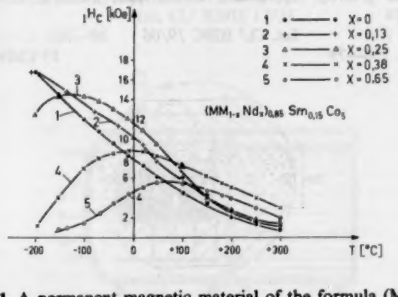
Hans-Peter Klein, Nussbaumen, and Hartmut Nagel, Baden, both of Switzerland, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Continuation of Ser. No. 635,215, Nov. 25, 1975, abandoned. This application Jun. 14, 1977, Ser. No. 806,338

Claims priority, application Switzerland, Jan. 14, 1975, 398/75

Int. Cl.² H01F *1/02*

U.S. Cl. 148—103 **10 Claims**



1. A permanent magnetic material of the formula $(MM_{1-x}Nd_x)_{1-y}Sm_yCo_5$, in which, $0.38 \leqq x \leqq 0.65$, $0 \leqq y \leqq 0.25$, and MM of mischmetal of the composition Ce_α La_{62} Pr_γ wherein the parameters α, β, γ satisfy the conditions

$$0.50 < \alpha < 0.70$$

$$0.22 < \beta < 0.45$$

$$0.00 < \gamma < 0.06, \text{ and } \alpha + \beta + \gamma = 1.$$

wherein the coercivity of permanent magnets prepared from said permanent magnetic material varies only ±10% between the temperatures of 0° - 170° C.

4,090,893

BONDING AGENT SYSTEM FOR IMPROVED PROPELLANT AGING AND LOW TEMPERATURE PHYSICAL PROPERTIES

Marjorie T. Cucksee, Huntsville, and Henry C. Allen, Decatur, both of Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 11, 1977, Ser. No. 840,927

Int. Cl.² C06B *45/10*

U.S. Cl. 149—19.9 **2 Claims**

1. A bonding agent system for use in a hydroxy-terminated polybutadiene propellant composition that is curable with a diisocyanate curing agent and that contains a high solids loading of aluminum metal fuel and ammonium perchlorate oxidizer, said bonding agent system consisting of the reaction product of 2.0 moles of tris 1(2 methyl aziridinyl)phosphine oxide, 0.7 mole adipic acid, and 0.3 mole tartaric acid in an amount from about 0.10 to about 0.20 weight percent of said propellant composition; bis isophthaloyl 1(2 methyl)aziridine in an amount from about 0.10 to about 0.20 weight percent of said propellant composition; and butyliminodiethanol in an amount from about 0.02 to about 0.05 weight percent of said propellant composition.

4,090,894

MOLDABLE ETHYLENE/VINYL ACETATE COPOLYMER

Russell Reed, Ridgecrest, and Horace D. Stanton, China Lake, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 21, 1977, Ser. No. 779,653

Int. Cl.² C06B *45/10*

U.S. Cl. 149—19.91 **6 Claims**

1. An explosive composition consisting essentially of

from 2 to 18 weight percent of a pliable, adhesive, desensitizing ethylene/vinyl acetate copolymer having a ratio of ethylene groups to vinyl acetate groups in the range of from 70:30 to 40:60; and

from 82 to 98 weight percent cyclic nitramine explosive; said composition having the property of being moldable.

4,090,895

HIGH ENERGY FUEL SLURRY

Edward Outten, Rockaway, N.J., assignor to Thiokol Corporation, Newtown, Pa.

Filed Jan. 13, 1966, Ser. No. 520,835

Int. Cl.² C06B *43/00*

U.S. Cl. 149—22 **8 Claims**

1. A fuel for rocket motors consisting essentially of a slurry of a high energy solid additive in non-settling suspension in a liquid fuel, said slurry comprising finely divided solids having a particle size of less than about 10 microns selected from the group consisting of boron, aluminum, aluminum boride, titanium boride, zirconium boride and mixtures thereof, and a liquid fuel selected from the group consisting of methanol, 1-ethanol, 1-propanol and 2-propanol, and mixtures thereof, said solids being suspended in said liquid in an amount less than about 80 percent by weight of the slurry in the presence of less than a thixotropic amount of a high viscosity grade of hydroxypropyl cellulose, and said fuel having a gas evolution rate within standard test limits for a packaged propellant when the fuel slurry is stored in a tank at 160° F. with 5% vapor space.

4,090,896

MAKING INSULATED CONDUCTORS

Daryl Lester Myers, Lawrenceville, Ga., assignor to Western Electric Company, Inc., New York, N.Y.

Continuation of Ser. No. 538,822, Jan. 6, 1975, abandoned. This application Jun. 7, 1976, Ser. No. 693,605

Int. Cl.² H01B *13/14*

U.S. Cl. 156—51 **3 Claims**

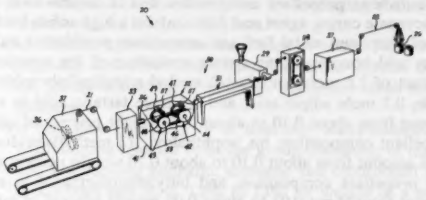
1. A method of making an insulated conductor suitable for

use in a communications transmission system, which includes the steps of:

extruding at least one insulative covering about a conductive element to form an insulated conductor;

moving the insulated conductor through a cooling medium in a path which includes a substantially linear portion sufficient in length to prevent deformation of the covering upon the conductor being advanced subsequently along a convolute path;

moving the insulated conductor along a convolute path in



spaced-apart convolutions which are strung up between two spaced cylindrical surfaces with the convolutions capable of being varied as to number so that they together with the length of the substantially linear portion are sufficient to insure that the temperature of an insulated conductor moved through the linear portion, then into and out of the convolute path is substantially constant and at a desired predetermined temperature; and

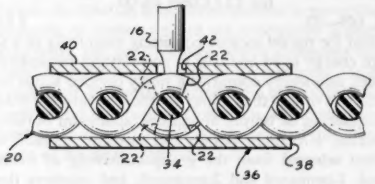
measuring the coaxial capacitance of the insulated conductor after it has been moved out of the convolute path and while it is at the predetermined temperature.

4,090,897

ULTRASONIC WELDING OF THERMOPLASTIC FABRICS

David G. Minick, Westfield, Mass., assignor to The Sinclair Company, Holyoke, Mass.

Filed Apr. 22, 1977, Ser. No. 790,018
Int. Cl.[2] B32B *31/20*
U.S. Cl. 156—73.1 6 Claims



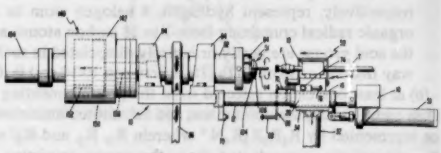
1. Method of bonding together mesh fabric composed of thermoplastic filaments comprising the step of juxtapositioning in overlapping relation free edge portions of said fabric with the filaments constituting one edge being superimposed with the filaments constituting the other edge, selectively compressing said superimposed filaments between a metallic anvil and the tip of an ultrasonic welding tool, said anvil being in the form of a metal plate with a transparent template carried thereby, said template being provided with a plurality of spaced apertures extending thereacross in an undulating pattern, and applying ultrasonic energy to said superimposed filaments at spaced points defined by the apertures in said template, the tip of said tool having a relief surface for engagement with said filaments.

4,090,898

METHODS AND APPARATUS FOR SPIN WELDING THERMOPLASTIC WORKPIECES

Michael E. Tuskos, Louisville, Ky., assignor to Celanese Corporation, New York, N.Y.

Filed Mar. 2, 1977, Ser. No. 773,481
Int. Cl.[2] B32B *31/20*
U.S. Cl. 156—73.5 30 Claims



23. A method of spin welding thermoplastic workpieces comprising the steps of:

rotating a gripping member having radially closable jaws,

positioning between said jaws a first workpiece mounted upon a second workpiece,

subsequent to said rotating and positioning steps, closing said rotating jaws radially into gripping contact with said first workpiece to spin said first workpiece relative to said second workpiece, to melt the interface between said workpieces, and

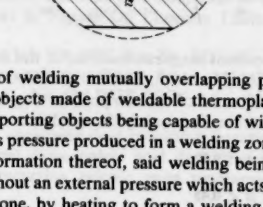
subsequently releasing said jaws from said first workpiece while said jaws continue to rotate.

4,090,899

THERMOPLASTICS WELDING METHOD

Fritz Reich, Uhwiesen, Switzerland, assignor to Georg Fischer A.G., Schaffhausen, Switzerland

Filed Dec. 3, 1975, Ser. No. 637,118
Claims priority, application Switzerland, Dec. 6, 1974, 16221/74
Int. Cl.[2] B29C *19/06*
U.S. Cl. 156—79 19 Claims



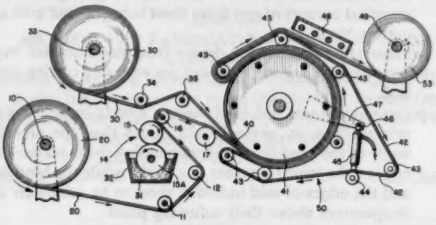
1. A method of welding mutually overlapping portions of self-supporting objects made of weldable thermoplastic material, said self-supporting objects being capable of withstanding or supporting gas pressure produced in a welding zone without a significant deformation thereof, said welding being effected substantially without an external pressure which acts vertically to the welding zone, by heating to form a welding zone containing said thermoplastic material in an at least plastic state in an area between said mutually overlapping portions, said method comprising the step of providing an expanding agent in said welding zone, said agent producing at the temperature of said welding zone a gas pressure effective in said welding zone.

4,090,900

LAMINATE PRODUCTS USEFUL IN THE PRODUCTION OF BRA CUPS AND PROCESS FOR MAKING SAME

Salvatore Jacaruso, Maspeth, and Joseph A. Giuliano, Oyster Bay, both of N.Y., assignors to Acar Laminators Corp., Brooklyn, N.Y.

Filed Jul. 6, 1976, Ser. No. 702,907
Int. Cl.[2] A41C *3/12*; B29C *27/14*; B32B *27/02, 27/08, 31/12, 31/20*
U.S. Cl. 156—85 7 Claims



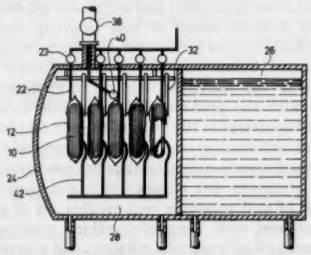
1. A process for the continuous manufacture of a pre-shrunk laminate composition, which includes at least two fabric outer layers and an intermediate fiberfill layer disposed between said outer layers, comprising (a) continuously applying a flow of an adhesive composition to said intermediate fiberfill layer in a direction opposite to the direction of movement of said fiberfill layer to penetrate said fiberfill layer with said adhesive, (b) serially bringing the opposite sides of the faces of said fiberfill layer into intimate contact with said fabric outer layers, and (c) uniformly applying heat and pressure to said contacted layers of fabric and fiberfill at temperatures and pressures and for a time sufficient to securely bond said layers together while uniformly pre-shrinking said layers.

4,090,901

RECAPPING METHOD

Guenter Adolf Baatz, 29 Chicopee Terrace, Kitchener, Ontario, Canada (N2A 1T2)

Filed May 31, 1977, Ser. No. 802,018
Claims priority, application Canada, May 17, 1977, 278552
Int. Cl.[2] B29H *17/36*
U.S. Cl. 156—96 7 Claims



1. An improved method of recapping rubber tires using hot water to cure a tread onto a prepared tire comprising the steps of:

(a) enclosing a tread covered tire in an air-tight flexible envelope,

(b) placing the enclosed tires into a sealed container,

(c) introducing a small amount of water into the container to increase the air pressure in the container sufficiently to force the air out of the envelopes via vent means leading from the interior of the envelope to the atmosphere to press the envelope against the tread to hold it securedly against the tire,

(d) after the air is expelled from the envelope, introducing more water into the kettle to cover the tire in water at a predetermined temperature and pressure,

(e) maintaining the water in the container under the predetermined temperature and pressure for a predetermined time until the tire is cured, and

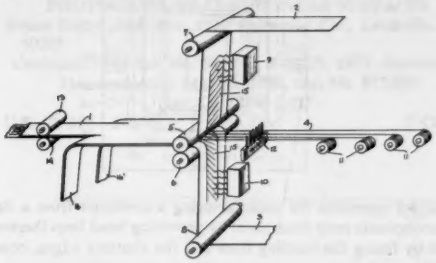
(f) removing the water from the container and the cured tire from the envelope.

4,090,902

OPTICAL FIBER CABLE AND MANUFACTURE THEREOF

Antonio Ferrentino, and Germano Beretta, both of Monza (Milan), Italy, assignors to Industrie Pirelli, S.p.A., Milan, Italy

Division of Ser. No. 465,827, May 1, 1974, Pat. No. 3,937,559.
This application Oct. 31, 1975, Ser. No. 627,698
Claims priority, application Italy, May 23, 1973, 24442 A/73
Int. Cl.[2] G02B *5/16*
U.S. Cl. 156—177 3 Claims



1. A process for manufacturing a composite optical fiber band which comprises a pair of self-supporting, synthetic thermoplastic films having therebetween a plurality of optical fibers each of which is long relative to its cross-sectional dimension, is longitudinally continuous and transmits light in the direction of its length, each said fiber being spaced from the other fibers in the direction transverse to their lengths and each following undulate paths, said films being sealed together at their facing surfaces, each said fiber having a solid central core of light transmitting material coated with a layer of a solid material having an index of refraction smaller than the index of refraction of said core, each said fiber having a low ultimate elongation and being brittle and said films being elastic whereby the films protect the fibers which are subjected to little stress when the band is subjected to tension or bending stresses within the elastic limits of the films, said process comprising:

feeding a pair of said synthetic thermoplastic films which are continuous in the direction of feed toward each other with surfaces thereof facing and spaced from each other while applying heat by radiant energy heating means located at a first position and directing the energy only on said facing surfaces to heat at least central portions of said facing surfaces to a temperature higher than the softening point temperature thereof to thereby soften said surfaces, said surfaces being free of an adhesive;

feeding intermediate said adhesive free, facing surfaces of said films while said surfaces are spaced apart and on the so-heated and softened central portion of one of said surfaces at a rate greater than the feeding rate of said films, a plurality of individual said optical fibers in side-by-side relation but with each fiber spaced from all the other fibers while undulating said fibers in a direction generally parallel to said one surface to thereby deposit said fibers on said one surface in undulate paths; and

pressing said films together at a second position immediately after the first position at which the surfaces are softened

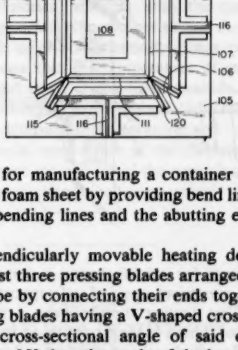
without further heating of the films at such second position, said films being pressed together after said fibers have been deposited on said one surface and while said facing surfaces are softened to thereby seal said films together with said fibers therebetween and embedded therein without use of a separate adhesive.

4,090,903

APPARATUS AND METHOD FOR MANUFACTURING A CONTAINER FROM A THERMOPLASTIC RESIN FOAM SHEET

Takashi Matsui, Nara, Japan, assignor to Sekisui Kaseihin Kogyo Kabushiki, Nara, Japan

Filed Apr. 21, 1976, Ser. No. 678,985
Claims priority, application Japan, Apr. 26, 1975, 50-51182
Int. Cl.[2] B31F *3/00*
U.S. Cl. 156—211 **11 Claims**



1. An apparatus for manufacturing a container from a flat thermoplastic resin foam sheet by providing bend lines thereon and by fusing the bending lines and the abutting edges, comprising:

(a) a free, perpendicularly movable heating device composed of at least three pressing blades arranged to form a polygonal shape by connecting their ends together, each of said pressing blades having a V-shaped cross section at its edge, the cross-sectional angle of said edge being smaller by 10° – 25° than the angle of the bend in the flat thermoplastic resin foam sheet, and cutting blades, each having an edge level higher by 0.5 – 1.5 mm than the edge level of a linear pressing blade, the point of intersection of said cutting blades being disposed at a position deviated by 1 – 2 mm diagonally outward from the corner of the polygon defined by the pressing blades, and an opening angle of said cutting blades which does not exceed 90°;

(b) a hollow mold which has an inner surface to accommodate an unfolded foam sheet and formed by a combination of the linear pressing blade and a cutting blade provided on the heating device, and, wherein, in the hollow mold the bend lines and the joining sides of the unfolded sheet are connected to form a container, and,

(c) a cutout piece ejecting device having a scraper which moves forward and backward in differentiated routes for ejecting the cutout pieces which have been cut out by said cutting blades on the surface of the hollow mold, characterized by a heating device to form the thermoplastic resin foam sheet which is guided to the surface of the hollow mold and into an unfolded sheet.

5. A method for manufacturing a container of thermoplastic resin foam material comprising:

(a) pressing a flat thermoplastic resin foam sheet by means of a heating device composed of at least three linear pressing blades so as to form a polygonal shape by connecting their respective ends together, each of said pressing blades having a V-shaped cross section at its edge, and the cutting blades of each having an edge level higher by 0.5–1.5 mm than the edge level of the linear pressing blades, being disposed at a position deviated by 1–2 mm outwardly from the corner of the polygonal defined by the pressing blades, and an opening angle of said cutting blades being not exceeding 90°;

(b) producing an unfolded sheet formed with bend lines by pressing with approximately 0.5–1.5 mm thickness of said foam sheet retained by means of at least three linear V-shaped polygonal grooves with their respective ends connected together, said foam sheet including the areas of the bottom plate and the side walls bordered by said bend lines, groove bevels having an angle 10°–25° smaller than the angle of the side wall portion in relation to the plane of the device, and formed with the joining edges and the marginal corners of said foam sheet being cut out with said cutting blades;

(c) separating said heating device from said unfolded sheet;

(d) ejecting the cutout pieces cut out with said cutting blade; and,

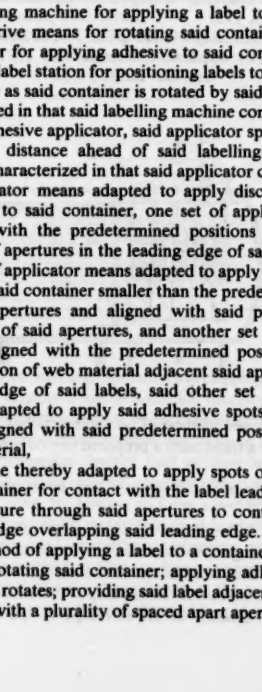
(e) assembling said unfolded sheet in a body by erecting the side walls at an angle 10°–25° more than the aforesaid angle of the bend line and fuse-bonding the bend lines and edges to be joined together at a stroke while the bend lines and the edges of said unfolded sheet to be joined are at a temperature above their softening point.

4,090,904

LABELLING

Christopher I. Mahoney, Hingham, Mass., assignor to Distribution Systems, Inc., Dorchester, Mass.

Filed Apr. 8, 1976, Ser. No. 675,254
Int. Cl.[2] B65C *3/12, 9/20*
U.S. Cl. 156—215 **30 Claims**



1. A labelling machine for applying a label to a container, comprising drive means for rotating said container, an adhesive applicator for applying adhesive to said container as it is rotated and a label station for positioning labels to be applied to said container as said container is rotated by said drive means,

characterized in that said labelling machine comprises only a single adhesive applicator, said applicator spaced a predetermined distance ahead of said labelling station, and further characterized in that said applicator comprises sets of applicator means adapted to apply discrete spots of adhesive to said container, one set of applicator means aligned with the predetermined positions at said label station of apertures in the leading edge of said labels, said one set of applicator means adapted to apply said adhesive spots to said container smaller than the predetermined size of said apertures and aligned with said predetermined positions of said apertures, and another set of applicator means aligned with the predetermined positions at said label station of web material adjacent said apertures at the leading edge of said labels, said other set of applicator means adapted to apply said adhesive spots to said container aligned with said predetermined positions of said web material,

said machine thereby adapted to apply spots of adhesive to said container for contact with the label leading edge and for exposure through said apertures to contact the label trailing edge overlapping said leading edge.

9. The method of applying a label to a container comprising the steps of: rotating said container; applying adhesive to said container as it rotates; providing said label adjacent the leading edge thereof with a plurality of spaced apart apertures therein;

contacting said label adjacent said leading edge with a portion of said adhesive on said container as said container continues to rotate and simultaneously exposing a portion of said adhesive through said apertures; continuing to rotate said container wrapping said label thereabout; and overlapping the portion of said label adjacent said trailing edge thereof over said apertures contacting said overlapped portion of said label with adhesive exposed through said apertures; whereby said adhesive secures said label directly to said container adjacent said leading and overlapped trailing edges.

4,090,905

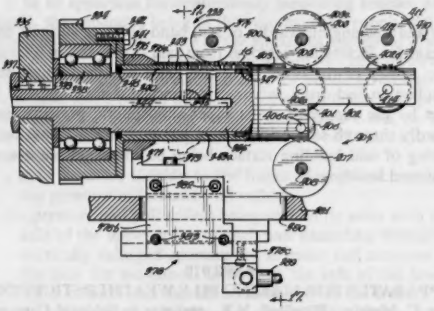
METHOD FOR FABRICATING THERMOPLASTIC CONTAINERS

Stephen W. Amberg, Toledo, Ohio, and Ralph G. Amberg, Monticello, Ind., assignors to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 418,612, Nov. 23, 1973, abandoned. This application Apr. 30, 1976, Ser. No. 681,854

Int. Cl.[2] B29D *23/10*; B29C *27/02*

U.S. Cl. 156—218 **3 Claims**



1. The method of forming a sheet blank of thermoplastic material into a sleeve comprising the steps of: affixing the leading end of said sheet blank to the exterior of a generally cylindrical shaped forming member; rotating said forming member to cause said sheet blank to be wrapped thereabout into a generally tubular shape with the trailing end portion of the sheet blank overlapping the leading end portion; transferring said tubular shape axially relative said forming member by applying pressure against an axial end thereof; directing air from a heating means toward said end portions to pneumatically lift said overlapping portion and to progressively heat soften the facing surfaces of said end portions as said tubular shape is axially transferred, concurrently maintaining unheated facing surfaces of said end portions in contacting relationship; and pressing said overlapping end portion against the other end portion to compress said softened surfaces to form a sleeve having a liquid-tight seam.

4,090,906

METHOD OF MAKING A TRIM STRIP

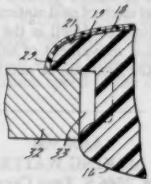
Robert A. Zoller, Bay Village, Ohio, assignor to The Standard Products Company, Dearborn, Mich.

Continuation of Ser. No. 690,027, May 26, 1976, abandoned. This application May 9, 1977, Ser. No. 794,922

Int. Cl.[2] B29F *3/00*

U.S. Cl. 156—244.27 **3 Claims**

1. The method of producing a continuous decorative trim strip which includes the steps of: extruding a plastic material to produce a continuous flexible body with a lower portion having substantially parallel sides and a top portion having a laterally extending flange at each side edge extending above and laterally beyond the parallel sides, advancing said continuous flexible body and a decorative strip between bottom and top rollers which closely confine said body and decorative strip for securing the body and strip together under pressure, supporting all portions of said flexible body against movement in the direction of pressure application by said rollers, and advancing the strip from the rollers to have the parallel sides on the lower portion of said body pass between a pair of spaced milling



cutters to produce inwardly extending recesses below the flanges and into the parallel sides of the lower body portion to facilitate retention of said flexible trim strip.

4,090,907

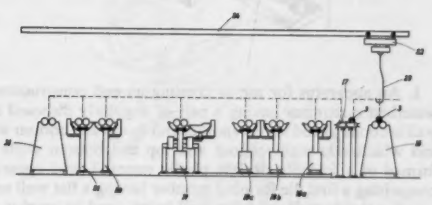
APPARATUS FOR AUTOMATICALLY PROCESSING PHOTOGRAVURE CURVILINEAR SURFACES

James Kagey Anderson, 1110 Rostrevor Cir., Louisville, Ky. 40205

Continuation of Ser. No. 392,475, Aug. 29, 1973, abandoned. This application May 15, 1975, Ser. No. 577,899

Int. Cl.[2] C23F *1/02*

U.S. Cl. 156—345 **7 Claims**



1. An apparatus for processing of photogravure curvilinear surfaces comprising: (a) at least three etching stations located in side by side sequential relationship to each other in a co-extensive series, each including opposed vertically extending support members and an etching tray positioned therebetween, said support members terminating in gravure cylinder receiving means for supporting said curvilinear surfaces in a preselected relationship with said tray, said cylinder receiving means being powered for rotating said surfaces at a preselected speed, and, an etching system including for each station, an etching solution, an etching solution transfer means and an etching solution storage means in communication therewith, said transfer means functioning to transfer etching solution from said storage means to said etching tray and back for reuse, the concentration of the etching solution of each station being more dilute than in the preceding of each of said sequential stations in said series; (b) at least one cleaning station located in sequential, co-extensive relationship to the last of the etching stations in said series, and including opposed vertically extending support members and cleaning solution receiving means supported therebetween, said support members terminating in powered curvilinear surface receiving means for supporting and rotating said curvilinear surfaces at a preselected speed, said cleaning station further including a cleaning system having a cleaning solution, cleaning solution transfer means, a cleaning solution storage means in communication therewith, and delivery means for applying said cleaning solution to said cylinder, and (c) conveying means supported in juxtaposition above said etching and cleaning stations for sequentially conveying said curvilinear surfaces to and from successive etching stations in said series and for then conveying said curvilinear

surfaces to and from said cleaning station, all of said cylinder receiving means at said stations functioning collectively, in combination with said conveying means and said successively dilute etching solutions to provide that each of said curvilinear surfaces are treated at each of said stations during a preselected dwell time, which time of dwell is the same at each station, thereby providing that movement of said curvilinear surfaces from one station to the next can be accomplished at a uniform rate.

4,090,908

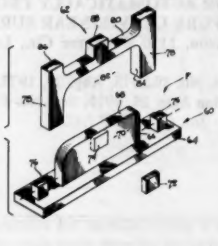
APPARATUS FOR MAKING WATER BED MATTRESSES

Raymond M. Phillips, 2566 S. Tuna Canyon Rd., Malibu, Calif. 90265, and William J. Pease, 3537 Bagley Ave., Los Angeles, Calif. 90034

Division of Ser. No. 636,696, Dec. 1, 1975. This application May 9, 1977, Ser. No. 794,941

Int. Cl.² B32B *19/02, 31/00*

U.S. Cl. 156—380 **5 Claims**



1. An apparatus for use in creating an end construction in waterbed mattresses having a pair of angularly disposed side wall sections joined to one another and to top and bottom walls and which side wall sections and top and bottom walls are formed of a foldable flexible plastic material, said apparatus comprising a first die forming member having a flat wall and a peripheral side wall, said flat wall being sized to receive and retain an insert panel with a portion of said insert panel being folded over to be disposed on a portion of said peripheral side wall and where said panel is pre-cut to conform to the shape of said flat wall and peripheral side wall, said insert panel also being formed of a foldable flexible plastic material, said peripheral side wall having a shape to accommodate the margin of material surrounding a cut-out in one of the side wall sections of said mattress, retaining means to retain said margin of said material and the folded portion of said insert panel on said first die forming member, said retaining means comprising a second die forming member having a size and shape to extend around said peripheral side wall and engage the material and insert panel thereon, said first and second die forming members being constructed of a material to accommodate dielectric energy, said second die forming member having a pair of leg elements connected by a bight element and which bight element is substantially thinner in cross section than each of said leg elements, and means on said second die forming member to receive the dielectric energy and apply same to the folded over portion of said insert panel and said margin of the material.

4,090,909

TIRE BAND BUILDING DRUM

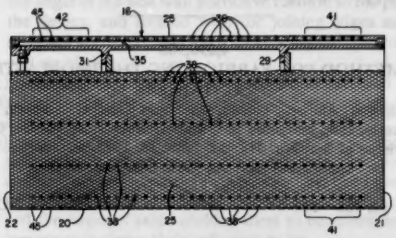
Christopher E. Christie, Akron, Ohio, and Eddie B. Steffey, Danville, Va., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Aug. 20, 1976, Ser. No. 716,327

Int. Cl.² B29H *17/14*

U.S. Cl. 156—414 **3 Claims**

1. A tire band building machine including a non-collapsible, cylindrical band building drum; means mounting said drum for rotation about its longitudinal axis; said drum comprising a rigid cylindrical member having an external cylindrical surface of fixed diameter disposed concentrically of and facing radially outwardly of said axis to provide a band building surface upon which a sheet of tire building stock may be wrapped and stitched to provide a tire band; said drum being provided with means for supplying air at super-atmospheric pressure between said band building surface and a tire band which has been built thereon including a plurality of orifices provided in said member and opening outwardly of said band building surface; and means for facilitating removal from said drum, and in a direction axially of the drum, of a tire band wrapped about and stitched on said drum, where said removal is accomplished in part by the supply of air at super-atmospheric pressure outwardly through said orifices, said last-mentioned means consisting of said building surface being provided with a coarse diamond knurling.



4,090,910

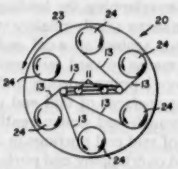
APPARATUS FOR MAKING PILE WEATHERSTRIPPING

Jay C. Metzler, Pittsford, N.Y., assignor to Schlegel Corporation, Rochester, N.Y.

Division of Ser. No. 536,315, Dec. 26, 1974, Pat. No. 4,024,004. This application Feb. 28, 1977, Ser. No. 772,475

Int. Cl.² D04H *11/08;* **B65H** *81/06*

U.S. Cl. 156—430 **3 Claims**



1. Pile weatherstripping making machinery comprising:

a. means for forming in situ a plurality of continuous lengths of solid unsupported resin anchorage bases for weatherstripping, each base shaped for an interference fit in a retainer slot;

b. means for advancing said unsupported bases in one direction in parallel relation;

c. means for wrapping a yarn continuously around said bases in a direction transverse to said one direction as they advance;

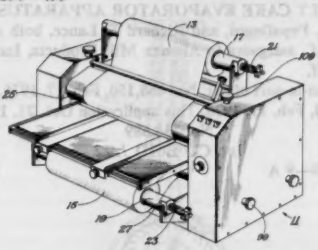
d. means on opposite sides of each of said bases for securing said yarn to opposite sides of each of said bases; and

e. means parallel to and spaced between said bases for slitting said yarn in said one direction to form a plurality of said bases, each having an insulating pile row extending in said transverse direction outward from each of said opposite sides of said base to extend outward from said retainer slot when said base is fitted in said retainer slot.

4,090,911
LAMINATING APPARATUS

Myron W. Shaffer, Irving, Tex., assignor to Thermo-Seal, Inc., Fort Worth, Tex.

Filed Feb. 23, 1977, Ser. No. 771,179
Int. Cl.[2] B32B 31/00; B31F 5/00
U.S. Cl. 156—499 8 Claims



1. In an apparatus for continuously laminating articles with plastic, the apparatus being of the type having a supply roll of plastic mounted to the frame of the apparatus, means for drawing a web of the plastic from the supply roll past heating means and through a pair of pressure rollers for bonding the web to the article, and a pair of pull rollers mounted behind the pressure rollers for maintaining tension as the web cools, an improved means for mounting the pressure and pull rollers to the frame comprising:

a slide mounted slidably to the frame adjacent each end of the pressure rollers and pull rollers;

the pressure and pull rollers being carried by axles with the axle of the upper roller of each pair extending through a vertically enlarged aperture in the frame and mounted to the slide for movement therewith; the axle of the lower roller of each pair mounted stationarily to the frame;

spring means for biasing the slide downward with respect to the frame to provide pressure between the upper and lower rollers;

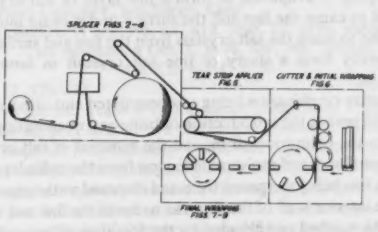
a disk mounted rotatably in the slide below the lower rollers; and

a rod extending through a vertically enlarged aperture in the frame and mounted to the disk for rotation therewith; the rod and disk being eccentric with respect to each other so that rotating the rod causes the slide to move upward, creating a clearance between the upper and lower rollers for threading and cleaning.

4,090,912
WRAPPING MACHINES

Robert William Davies; Frederick Pratt, and Michael Gordon Pearse, all of London, England, assignors to Molins Limited, London, England

Filed Sep. 24, 1976, Ser. No. 726,097
Claims priority, application United Kingdom, Oct. 1, 1975, 40116/75
Int. Cl.[2] B65H 69/06; B31F 5/00
U.S. Cl. 156—502 7 Claims

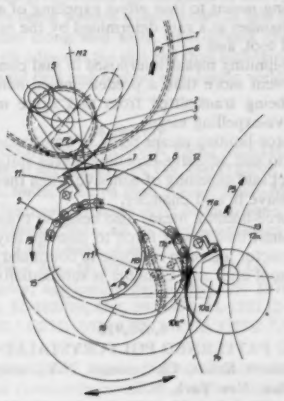


1. Apparatus for wrapping articles, such as cigarette packets, comprising means for cutting a web of wrapping material to form individual wrappers, means for feeding the wrappers successively towards articles to be wrapped, drive means to drive the cutting and feeding means at a cyclically varying speed which cyclically decreases to a minimum speed, and clutch means to disengage the drive means when no wrappers are to be fed, said clutch means being disengageable and reengageable at the minimum speed of the drive means.

4,090,913
LABEL TRANSFER SYSTEM FOR A LABELING STATION

Rudolf Zodrow, Dusseldorf, Germany, assignor to Jagenberg-Werke Aktiengesellschaft, Dusseldorf, Germany

Filed Jun. 9, 1976, Ser. No. 694,411
Claims priority, application Germany, Jul. 4, 1975, 2529872
Int. Cl.[2] B32B 31/00; B65C 9/08
U.S. Cl. 156—560 8 Claims

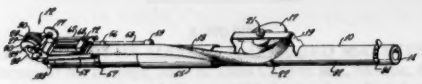


1. In a label transfer system for picking up a first label from a first station and for affixing it to a moving object at a second station, and comprising a rotating carrier wheel, a first segment on said wheel for carrying a glued label, a rotating carrier for moving objects at said second station, a first rotating pick up and affixing carousel, a first affixing member carried by said first carousel which first member receives said glued label at said first station and upon rotation of said first carousel later affixes said label to a moving object at said second station, the improvement which comprises forming said first carousel so the first affixing member travels an endless oval path including first and second independent arcuate sections each having a respective axis, the first arcuate section being positioned adjacent the first station and the second section being positioned adjacent the second station, and means for pivoting the first carousel about said first axis from a first position to a second position in which the second axis is displaced, the orientation of said first affixing member relative to said first segment being the same in the first and second positions of said first carousel because of the first arcuate section, the orientation of said first affixing member relative to the moving objects at said second station being different in the first and second positions of said first carousel due to the displacement of said second arcuate section, the different orientations corresponding to different diameters of the moving objects at said second station.

4,090,914
APPARATUS FOR APPLYING TAPE AND ADHESIVE TO WALLBOARD JOINTS

Thomas D. Hauk, Long Beach, and Masato Howard Konishi, Sun Valley, both of Calif., assignors to Service Equipment Design Co., Inc., Signal Hill, Calif.

Filed Apr. 4, 1977, Ser. No. 784,243
Int. Cl.[2] B32B *31/00*; B44C *7/00*; B05C *11/02*
U.S. Cl. 156—523 39 Claims



1. A tool for supplying adhesive at a predetermined rate determined by the rate of traverse of the tool along an element of a building under construction, said tool comprising:

(a) means to define a reservoir chamber adapted to contain adhesive,

(b) means to effect progressive expelling of adhesive from said chamber for application to an element of a building under construction,

(c) drive means adapted to engage said building element for driving in response to traverse of the tool therealong,

(d) means to connect said drive means to said adhesive-expelling means to thus effect expelling of adhesive from said chamber at a rate determined by the rate of traverse of said tool, and

(e) force-limiting means interposed in said connector means to prevent more than a predetermined amount of force from being transmitted from said drive means to said adhesive-expelling means,

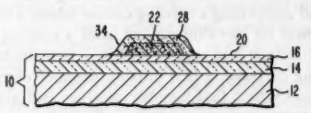
said force-limiting means being so constructed as to transmit to said adhesive-expelling means sufficient force to effect said expelling of adhesive when there is adequate adhesive in said chamber,

said force-limiting means also being so constructed as to transmit insufficient force to damage any part of said connector means in response to continued movement of the tool after said chamber is substantially empty.

4,090,915
FORMING PATTERNED POLYCRYSTALLINE SILICON

Kenneth Robert Keller, Chittenango, N.Y., assignor to RCA Corporation, New York, N.Y.

Filed Aug. 12, 1977, Ser. No. 824,224
Int. Cl.[2] H01L *21/306*
U.S. Cl. 156—628 9 Claims



1. A method of forming patterned polycrystalline silicon having a rounded profile on a substrate comprising the steps of

providing a defined source of one type conductivity modifiers adjacent said substrate where said patterned polycrystalline silicon is to be formed,

depositing a film of polycrystalline silicon, substantially void of said one type conductivity modifiers, over said defined source,

diffusing said one type conductivity modifiers from said defined source into regions of said film adjacent thereto, and

contacting the entire surface of said film with a solvent in which said film is soluble but in which said regions doped with said one type conductivity modifiers are substantially insoluble, for a time sufficient to remove the regions of said film that are substantially void of said one type conductivity modifiers, whereby said patterned polycrystalline silicon having a rounded profile is formed.

4,090,916
SALT CAKE EVAPORATOR APPARATUS

Pandelis N. Papafingos, and Richard T. Lance, both of Riverside, Calif., assignors to Alumax Mill Products, Inc., Riverside, Calif.

Continuation-in-part of Ser. No. 658,150, Feb. 17, 1976, and Ser. No. 658,430, Feb. 17, 1976. This application Oct. 21, 1976, Ser. No. 734,589
Int. Cl.[2] B01D *1/22*
U.S. Cl. 159—9 A 6 Claims

1. An evaporator system for recovering crystalline salt from heavy brine, comprising:

a long generally cylindrical drum;

means mounting the drum at a decline from the horizontal to from about two to about ten degrees from an input end down to an output end of the drum;

a multiplicity of fins mounted in the drum spaced from the wall of the drum and extending inwardly from the wall, the fins being disposed at an angle of from about five degrees to about eighty five degrees from the radius line of the drum which intersects the proximal edge of the respective fins;

the fins at the input end of the drum extending a less distance from the wall than the fins at the output end of the drum such that when in operation a body of brine is in the drum the bottom-most fins are immersed in the brine;

the fins being spaced about the interior curcumference of the drum and extending from the input end of the drum to the output end thereof;

an annular well mounted at the output end of the drum for providing a sump for removal of brine from the drum;

means for introducing brine at the input end of the drum;

means for removing brine slurry from the annular well at the output end of the drum;

means for forcing a stream of gas through the drum; and

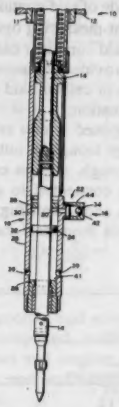
means for rotating the drum to cause the fins and the interior wall of the drum during operation to dip into a body of brine in the drum, to cause the fins to move upwardly and downwardly in the gas stream thereby causing the thin film of brine on the fins and the surface resulting from the dipping to evaporate to form a fine layer of salt crystals and to cause the fins and the surface to dip again into the brine to wash the salt crystals from the fins and surface to thereby form a slurry of fine salt crystals in saturated brine;

the entire combination being so constructed and disposed so as to permit the introduction of brine and evaporating gas into the cylindrical drum and the removal of salt crystal brine slurry and moisture laden gas from the cylinder with the fins being so spaced from and disposed with respect to the interior wall of the drum as to cause the fins and walls to be washed and abraded by the free flow of brine slurry over the fins toward the walls and downwardly along the walls toward the body of brine.

4,090,917
CONTROL ROD EJECTION RETARDATION ASSEMBLY

Felix Stanley Jabsen, Lynchburg, Va., assignor to The Babcock & Wilcox Company, New York, N.Y.

Filed Jul. 26, 1976, Ser. No. 708,785
Int. Cl.[2] G21C 7/08, 9/00
U.S. Cl. 176—36 R 7 Claims



1. An ejection retardation assembly for a control rod drive of a nuclear reactor allowing unretarded normal driven and "scram" operations while retarding any undesired ejection of a control rod comprising: a reactor vessel

control rod drive assembly having a leadscrew mounted in the nuclear reactor;

piston means mounted on the leadscrew of the control rod drive to be movable with the leadscrew in said reactor vessel;

enclosure means located in said reactor vessel to extend partially around the leadscrew to allow said piston means to move therein; and

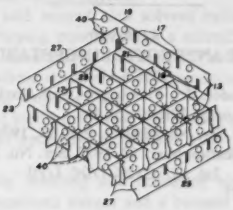
ejection retardation means for slowing down the movement of said piston means only when speedy ejection of a control rod is initiated due to a rupture in the control rod drive including a tubular portion formed in said enclosure means to provide a predetermined clearance for said piston means allowing the normal driven movement of said leadscrew and piston means therein and a ball valve assembly connected to said tubular portion to be located in said reactor vessel to allow fluid flow from said reactor vessel to said enclosure means to allow unretarded "scram" movement of said piston means therein and to shut off fluid flow from said reactor vessel to the enclosure means during speedy ejection of the leadscrew to retard the ejection of a control rod from the reactor thereby.

4,090,918
SPACER STRUCTURE

William R. Masetti, White Plains, N.Y., assignor to General Atomic Company, San Diego, Calif.

Continuation of Ser. No. 557,812, Mar. 12, 1975, abandoned.
This application Oct. 8, 1976, Ser. No. 730,974
Int. Cl.[2] G21C 3/30
U.S. Cl. 176—78 6 Claims

1. A nuclear reactor fuel element comprising a generally tubular support structure, a plurality of generally parallel fuel rods disposed longitudinally within said support structure and spacer structure for maintaining a spaced relation between said fuel rods, said spacer structure including a plurality of substantially parallel metallic first ribs supported by the support structure so as to extend thereacross, said first ribs each having a plurality of slots therein extending from the opposite longitudinal edges thereof in a direction perpendicular thereto, said slots being parallel with one another and spaced longitudinal along said first ribs with about half of said slots extending from each longitudinal edge, a plurality of substantially parallel metallic second ribs supported by the support structure and extending transversely of said first ribs, said second ribs each having a plurality of slots therein extending in a perpendicular direction from a single longitudinal edge thereof, said second ribs being interengaged with said first ribs at said slotted locations with about half of said slotted edges of said second ribs facing in one



direction and about half facing in the opposite direction, a pair of spaced detents being provided on each surface of said ribs, aligned with each slot and located generally near the longitudinal edge opposite said slot, said detents of each pair being spaced apart just greater than the thickness of said rib, said first and second ribs being welded to each other at said locations of interengagement along said slots, said detents engaging the interengaged rib adjacent the slot and thus maintaining desired alignment of said first and second ribs during welding.

4,090,919
WATER-INSOLUBLE TANNIN PREPARATION FOR IMMOBILIZATION OF PROTEINS

Ichiro Chibata, Suita; Tetsuya Tosa, Kyoto; Takao Mori, Takatsuki; Taizo Watanabe, Nagaokakyo; Ryujiro Sano, Toyonaka, and Yuhsi Matuo, Suita, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

Filed Jan. 19, 1977, Ser. No. 760,441
Claims priority, application Japan, Jan. 29, 1976, 51-8997; Aug. 27, 1976, 51-102894; Oct. 30, 1976, 51-131132
Int. Cl.[2] C07G 7/02; C07C 69/76; C07G 7/00
U.S. Cl. 195—63 41 Claims

1. A water-insoluble tannin preparation consisting essentially of tannin covalently bound to a water-inscluble, hydrophilic carrier selected from the group consisting of a hydroxy-polymer, an amino-polymer and a carboxyl-polymer through a diazo linkage or by means of at least one of cyanogen halide, epihalohydrin, α,ω-bis(2,3-epoxypropyl)alkane and α,ω-bis(2,3-epoxypropoxy)alkane.

14. A water-insoluble tannin preparation consisting essentially of tannin bound by physical adsorption to an alkyl-polysaccharide represented by the formula:

Polysaccharide-O-$CH_2CH(OH)CH_2O(CH_2)_mH$ wherein m is an integer of 1 to 16.

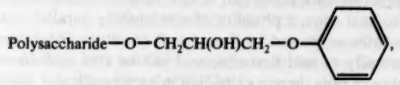
32. An immobilized protein consisting essentially of a biologically active protein adsorbed physically by a water-insoluble tannin preparation, said preparation consisting essentially of tannin covalently bound to a water-insoluble, hydrophilic carrier selected from a hydroxy-polymer, an amino-polymer and a carboxyl-polymer through a diazo linkage or by means of at least one of cyanogen halide, epihalohydrin, α,ω-bis(2,3-epoxypropyl)alkane and α,ω-bis(2,3-epoxypropoxy)alkane.

36. An immobilized protein consisting essentially of a biologically active protein adsorbed physically by a water-insoluble tannin preparation, said preparation consisting essentially of tannin bound by physical adsorption to a polysaccharide derivative taken from the class consisting of:

Polysaccharide—O—$CH_2CH(OH)CH_2O(CH_2)_mH$,

Polysaccharide—O—$CH_2CH(OH)CH_2NH(CH_2)_mH$,

Polysaccharide—O—$CONH(CH_2)_mH$,



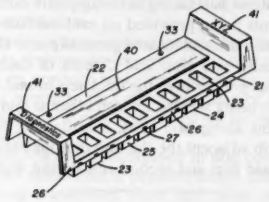
Polysaccharide—O—$CH_2CH(OH)CH_2NH(CH_2)_mNH_2$, and
Polysaccharide—O—$CH_2CONH(CH_2)_mNH_2$
wherein m is an integer of 1 to 16.

4,090,920

DISPOSABLE ANTIBIOTIC SUSCEPTABILITY TEST PACKAGE

John Eugene Studer, Jr., Flemington, N.J., assignor to Fisher Scientific Company, Pittsburgh, Pa.

Continuation of Ser. No. 659,452, Feb. 19, 1976, abandoned. This application Mar. 18, 1977, Ser. No. 779,413
Int. Cl.[2] C12K *1/04, 1/10*
U.S. Cl. 195—127 **4 Claims**



1. A biological culture test plate of a biologically inert transparent moldable plastic comprising:

a flat platform of an inert transparent moldable plastic,

said platform having therein a single row of separate rectangular wells extending adjacent a front edge of said platform, each well having a separate flat bottom and four separate approximately rectangular walls, the walls of each well having a slight taper to permit ready release from molding dies, and upstanding stack handles on each end of said platform, said handles being interiorly hollow, the platform having a skirt extending downwardly from the front edge thereof, the front edge of the skirt and the front of the handles forming a single plane, the backs of the handles forming a second plane, the planes being tapered so as to telescope whereby a plurality of test plates may be stacked in stable configuration with the handles telescoped and the handles may be used to manipulate a single test plate.

4,090,921

AUTOMATIC CULTIVATING APPARATUS

Ichiro Sawamura; Shinroku Sogi, both of Hachiouji; Shin-ichi Kamachi, Hino; Makoto Yoshinaga, Hachiouji; Atsuo Goto, Tachikawa; Masao Izawa, Hachiouji; Yoshio Nakajima, Hachiouji; Nagahiro Gocho, Hachiouji; Toshio Shinohara, Choufu, and Shin-ichiro Hattori, Takamatsu, all of Japan, assignors to Olympus Optical Co., Ltd., Japan

Filed Jul. 20, 1976, Ser. No. 707,068
Claims priority, application Japan, Jul. 22, 1975, 50-89315
Int. Cl.[2] C12K *1/10*
U.S. Cl. 195—127 **7 Claims**

1. An apparatus for automatically cultivating tissues or cells of a living body comprising:

at least one cultivating container into which the tissues or cells and a nutrient solution are placed, said container having a removable lid;

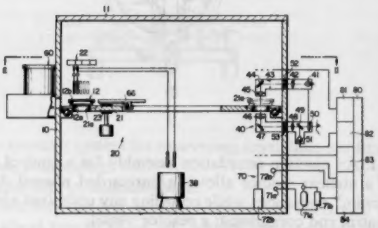
a plurality of empty cultivating containers each having a removal lid;

a main body into which said cultivating container containing the tissues or cells and the nutrient solution and said empty containers are placed, the inside of said main body isolated from the atmosphere;

a container carrier board mounted in said main body and having a plurality of circular holes near the periphery of said container carrier board for each receiving a container;

inspecting means comprising an illuminating optical system mounted on one side of said container carrier board and an observing and light-measuring optical system mounted on the other side of said container carrier board, said inspecting means being provided for inspecting the multiplication state of the tissues or cells in said cultivating container by transmitted illumination;

operating means disposed within said main body and comprising a discharge trough, a nutrient solution trough, a buffer solution trough, and an enzyme solution trough, each respectively connected to a nozzle through tubes, valves and pumps, and a centrifugal machine for receiving the multiplied cells from said cultivating container and



separating the multiplied cells from the nutrient solution, said operating means carrying out operations for subculture of the tissues or cells so that the multiplied tissues or cells are divided and fed into each of said empty cultivating containers, together with a fresh nutrient solution;

means for continuously detecting the atmosphere in said main body and maintaining the atmosphere constant, comprising a gas detector, gas control means, temperature detector and temperature adjustor;

control means disposed outside said main body comprising a valve control means, inspection and control means; drive means, and atmosphere detecting means, said control means controlling said inspecting means, operating means and means for continuously maintaining the atmosphere constant;

a container supply means for supplying new empty containers into said main body; and

means disposed within said main body for removing said lids from said containers for carrying out said operations and replacing said lids thereafter.

4,090,922

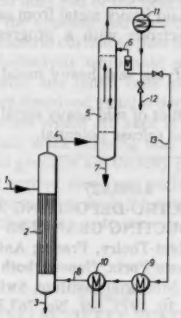
CARRIER-VAPOR DISTILLATION

Kurt Bauer, Holzminden; Hans-Walter Brandt, Odenthal, and Jurgen Schroter, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 682,878, May 3, 1976, abandoned, which is a continuation of Ser. No. 527,800, Nov. 27, 1974, abandoned. This application Feb. 2, 1977, Ser. No. 765,034
Claims priority, application Germany, Dec. 12, 1973, 2360977
Int. Cl.[2] B01D *9/02*
U.S. Cl. 203—48 **5 Claims**

1. In the separation of a heat-sensitive compound by carrier-vapor distillation with the vapor of an organic solvent for the compound, the improvement which comprises passing superheated solvent vapor through a solution of the compound in the solvent to form a gaseous mixture of the solvent and the compound counter currently, contacting said gaseous mixture with previously condensed solvent to provide a liquid bottom

product and to distill off a gaseous solvent vapor top product, the proportions of gaseous mixture and condensed solvent being such that the liquid bottom product is a saturated solution of the compound in the solvent almost at the boiling point



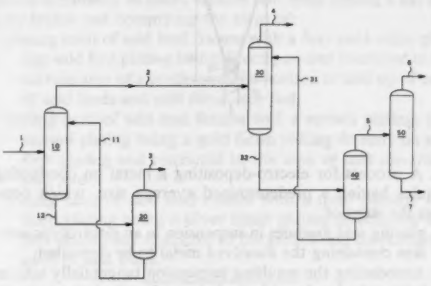
of the formed solution, cooling said solution thereby to effect crystallization of the compound, withdrawing the gaseous solvent vapor top product and cooling it to form said previously condensed solvent, and separating the crystallized compound from said solution.

4,090,923

BUTADIENE PURIFICATION WITH SIMULTANEOUS PREFRACTIONATION AND VINYLACETYLENE REJECTION

Donald M. Haskell, Bartlesville, and Cecil O. Carter, Wann, both of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 6, 1977, Ser. No. 785,157
Int. Cl.² B01D *3/40*
U.S. Cl. 203—51 **4 Claims**



1. A process for producing a purified butadiene stream comprising

a. extractively distilling in a first extractive distillation zone a feed stream consisting essentially of butadiene, butene-1, butene-2's, and vinylacetylene with a selective solvent selected from the group consisting of a methylethyl ketone and methylethyl ketone/sulfolane mixtures to form a first raffinate stream consisting essentially of butadiene, butene-1, a smaller concentration of butene-2's and a smaller concentration of vinylacetylene than the feed stream and being essentially free of said solvent, the weight ratio of the butene-2's to the vinylacetylene being at least 10:1, and a first rich solvent extract stream,

b. stripping said first rich solvent extract stream in a first stripping zone to form a first solvent stream and a vinylacetylene stream,

c. reintroducing at least a portion of said first solvent stream into said first extractive distillation zone as selective solvent,

d. extractively distilling said first raffinate stream in a second extractive distillation zone using as the selective solvent a mixture of methylethyl ketone and sulfolane, the methylethyl ketone concentration in the mixture being about 10 to about 40 wt. % methylethyl ketone, to form a second raffinate stream, and a second rich solvent extract stream consisting essentially of the selective solvent, butadiene, butenes, and vinylacetylene,

e. stripping said second rich solvent extract stream in a second stripping zone to form a second solvent stream consisting essentially of sulfolane and methylethyl ketone and a butadiene stream consisting essentially of butadiene, butenes and vinylacetylene,

f. recycling at least a portion of said second solvent stream to said second extractive distillation zone as selective solvent,

g. fractionally distilling said butadiene stream to form a purified butadiene stream and a butenes and vinylacetylene-comprising stream, and

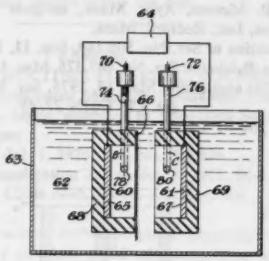
h. recovering said purified butadiene stream as the product of the process.

4,090,924

METHOD TO DETERMINE THE SUITABILITY OF DIAPHRAGM FOR USE IN AN ELECTROLYTIC CELL

Charles K. Bon, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 517,570, Oct. 24, 1974, abandoned. This application Oct. 18, 1976, Ser. No. 733,630
Int. Cl.² G01N *27/46*
U.S. Cl. 204—1 T **16 Claims**



1. A method comprising

(a) impressing a known direct current electromotive force between a primary anode and a primary cathode immersed in a test cell containing an electrolyte;

(b) measuring an electrical property across a predetermined portion of said electrolyte with two measuring electrodes positioned between said primary anode and cathode and communicating with said predetermined portion of said electrolyte by a first salt bridge and a second salt bridge having orifices spaced apart a predetermined distance;

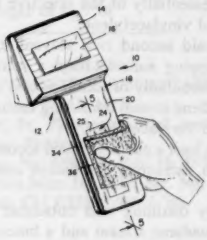
(c) inserting a metallic diaphragm into said solution between said measuring electrodes said electrolyte having a conductivity such that the insertion of said metallic diaphragm produces a voltage change between said primary electrodes insufficient to convert said metallic diaphragm into a bipolar electrode; and

(d) remeasuring the electrical property across said predetermined portion of said electrolyte as in (b).

4,090,925
PH MEASURING INSTRUMENT AND METHOD

Maury Jungman, Bayville, N.Y., assignor to J & M Instruments Corp., Bayville, N.Y.

Filed Aug. 9, 1976, Ser. No. 712,666
Int. Cl.[2] G01N 27/38
U.S. Cl. 204—1 T 11 Claims



1. A method of determining the pH value of a specimen utilizing a measuring instrument including at least two electrodes and means coupling the electrodes to a meter, said method comprising the steps of:

(a) removing contaminants from the electrodes by cleansing the electrodes in a dry state with a nonwoven polyamid filamentaceous web containing an abrasive material,

(b) wiping the electrodes with a clean, dry, absorbent, non-abrasive material,

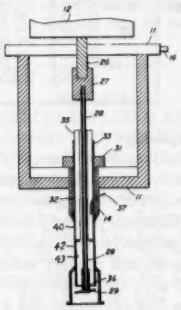
(c) implanting the electrodes in the specimen, and thereafter

(d) measuring the pH value of the specimen by observing the meter indication, whereby reliable determination of pH values may be obtained in the absense of distilled water cleansing.

4,090,926
TESTING PRODUCT

Wayne R. Matson, Ayer, Mass., assignor to Environmental Sciences, Inc., Bedford, Mass.

Continuation of Ser. No. 505,149, Sep. 11, 1974, abandoned, which is a division of Ser. No. 447,376, Mar. 1, 1974, abandoned. This application Mar. 15, 1976, Ser. No. 666,664
Int. Cl.[2] G01N 27/48
U.S. Cl. 204—1 T 7 Claims



1. A method of testing an organic sample for detection and measurement of trace quantities of at least one heavy metal comprising,

providing a matrix essentially free from said heavy metal and containing a measured quantity of at least one displacing metal ion-containing reagent adapted to displace the test metal from its organic chemical bonding and characterized by not plating out with said heavy metal at the electrolytic deposition potential of said heavy metal;

mixing with said matrix a measured quantity of the organic sample to be tested;

applying a cathodic electrolytic potential to said mixture to deposit said heavy metal on a test electrode,

thereafter releasing said heavy metal from said electrode by sweeping said electrode with a progressively varying anodic potential,

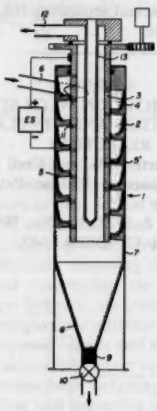
detecting and identifying said heavy metal by the release potential, and

measuring the quantities of said heavy metal by the electrolytic current at said release potential.

4,090,927
PROCESS FOR ELECTRO-DEPOSITING A METAL ON CONDUCTING GRANULES

Jean-Marie Fresnel, Haut-Thoiry, France; Antonin Kulhanek, Le Lignon, and Augusto Porta, Geneva, both of Switzerland, assignors to Battelle Memorial Institute, Switzerland

Filed Feb. 10, 1977, Ser. No. 767,312
Claims priority, application Switzerland, Feb. 12, 1976, 1686/76
Int. Cl.[2] C25C 1/00, 5/02, 7/00
U.S. Cl. 204—10 6 Claims



1. A process for electro-depositing a metal on conducting granules having a predetermined average size, which comprises the steps of:

a. placing said granules in suspension in an electrolytic solution containing the dissolved metal to be deposited;

b. introducing the resulting suspension tangentially into an inlet end of a closed helical channel wound about an axis of rotation and provided with two current collectors disposed coaxially at a predetermined radial distance apart and facing each other so that they longitudinally define two opposing sides of the helical channel;

c. respectively connecting said two collectors to the terminals of a current source such that the collector situated closest to said axis of rotation is connected to the positive terminal of the source to constitute the anodic collector, and the collector situated farthest from said axis is connected to the negative terminal to consistute the cathodic collector presenting an internal surface for electrical contact with said granules:

d. selecting the average size of said granules the average winding radius of said helical channel and the speed of introduction of said suspension therein as a function of each other and of the properties of said solution in such manner as to create at said inlet a rotating movement capable of producing a centrifugal force sufficient to

energetically propel said granules against said cathodic surface so as to bring them very rapidly into contact with said surface to cover said surface with a mobile layer of said granules, which is carried along said surface and kept in contact there with by the bulk of said solution circulating from said inlet end of the helical channel to an outlet disposed at the opposite end thereof;

e. causing an electric current to pass between said collectors to effect electrolysis while said solution circulates between the inlet and outlet ends of said helical channel, such that said dissolved metal is deposited electrolytically on the granules which are kept in contact with said cathodic surface while forming said mobile layer thereon, and that said granules are thereby progressively enlarged while being carried along said surface, and

f. separating the solution from the enlarged granules leaving the helical channel so as to remove them separately from each other.

4,090,928

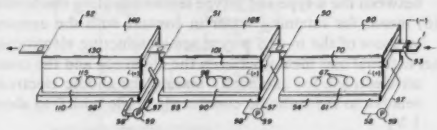
METHOD FOR SELECTIVELY PLATING LEAD FRAMES

Gene N. Pantiga, San Jose, and Robert M. Allen, Mill Valley, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Division of Ser. No. 628,541, Nov. 3, 1975, Pat. No. 4,033,844. This application Mar. 11, 1977, Ser. No. 777,234

Int. Cl.² C25D *5/02, 5/10*

U.S. Cl. 204—15 **1 Claim**



1. A method of selectively plating a lead frame strip, said strip including a plurality of lead frames, each of said frames having a plurality of leads, each of said leads having a tip, and a die-attach pad comprising the steps of:

plating each of said lead frames with a first gold strike plating, said first plating being directly on and restricted to the surface area of a predetermined portion of said tip of each of said leads and said die-attach pad;

plating each of said lead frames with a second plating, said second plating being a gold finish plating directly on said first plating and restricted to the area of said die-attach pad; and

plating each of said lead frames with a third plating, said third plating being a silver finish plating directly on said first plating and restricted to the area of said tip portion of each of said leads.

4,090,929

RAPID CHROMIC ACID ANODIZATION

Michel Jannier, Paris; Florent Berlo, Levallois Perret, and Jean Bridier, Paris, all of France, assignors to Pechiney Ugine Kuhlmann, Lyon, France

Filed May 20, 1977, Ser. No. 798,834

Claims priority, application France, Jun. 4, 1976, 76 18166

Int. Cl.² C25D *7/06, 11/06*

U.S. Cl. 204—28 **6 Claims**

1. Process for anodization of aluminum and alloys of aluminum comprising mounting the product to be anodized as the anode in an anodizing bath containing 100 to 200 g/liter of CrO_3, with an anode surface area expressed in dm^2 of between 1.7 B and 2.3 B where B denotes the volume of the bath in liters, with a cathode surface area expressed in dm^2 of less than 0.06 B. maintaining the temperature of the anodization bath at a temperature between 55° C and 70° C, and applying a constant voltage between the electrodes between 35 volts and 45 volts, and an anode current density between 3.5 A/dm^2 and 5 A/dm^2.

4,090,930

METHOD OF AND AN APPARATUS FOR COMPENSATING THE MAGNETIC FIELDS OF ADJACENT ROWS OF TRANSVERSELY ARRANGED IGNEOUS ELECTROLYSIS CELLS

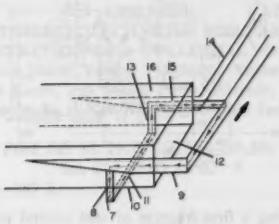
Paul Morel, Le Vesinet, and Jean-Pierre Dugois, Saint Jean-de-Maurienne, both of France, assignors to Aluminum Pechiney, Lyon, France

Filed Mar. 4, 1977, Ser. No. 774,392

Claims priority, application France, Aug. 3, 1976, 76 07404

Int. Cl.² C25C *3/06, 3/16*

U.S. Cl. 204—67 **8 Claims**



1. A method of compensating the magnetic fields of adjacent rows of transversely arranged igneous electrolysis cells, in which the current to the anode of a downstream cell is fed from the cathode of the adjacent upstream cell comprising superimposing upon the cell an electrical loop which produces an additional magnetic field substantially equal to that created by the adjacent row and opposite to it by diverting a portion of the current from the upstream conductor from the cathode of the downstream cell, passing the diverted current below the cell and rejoining the diverted current with the outer upstream conductor after being passed below the cell.

4,090,931

ANODE-STRUCTURE FOR ELECTROLYSIS

Kensuke Motani; Toshikatsu Sata, and Masakatsu Nishimura, all of Tokuyama, Japan, assignors to Tokuyama Soda Kabushiki Kaisha, Japan

Filed Jul. 1, 1976, Ser. No. 701,576

Claims priority, application Japan, Jul. 7, 1975, 50-82814

Int. Cl.² C25B *1/46, 11/00, 13/02, 13/04*

U.S. Cl. 204—98 **8 Claims**

1. An anode-structure for liquid-phase electrolysis of an aqueous solution of an alkali metal salt comprising an anode having a curved surface and a polymer containing cation exchange groups, said polymer being laminated in the form of a film on the curved surface of said anode.

8. In a process for electrolysis of an aqueous solution of an alkali metal salt, the improvement using the anode-structure of claim 1 as the anode.

4,090,932

METHOD FOR CONCENTRATING AQUEOUS CAUSTIC ALKALI SOLUTION

Akira Kazihara, Chofu; Shinsaku Ogawa; Takekuni Kobayashi, both of Nobeoka, and Maomi Seko, Tokyo, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Oct. 18, 1976, Ser. No. 733,714

Claims priority, application Japan, Oct. 28, 1975, 50-128857

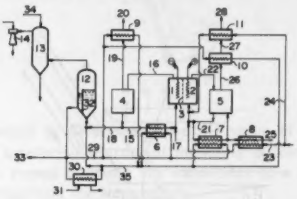
Int. Cl.² C25B *1/34*

U.S. Cl. 204—98 **8 Claims**

1. In a continuous process for producing an aqueous alkali

metal hydroxide solution by electrolysis of an aqueous alkali metal halide solution using a cation exchange membrane to divide the cell into cathode and anode compartments and concentrating, in an evaporator, the alkali metal hydroxide solution obtained as a catholyte the improvement which comprises utilizing the heat generated by electrolysis as a heat source for the heating side of the evaporator by the steps of:

1. circulating a first portion of the catholyte through a heat exchanger where it gives up heat values;
2. diverting a second portion of the catholyte to an evaporator;
3. adding sufficient water to the circulating catholyte to replace said second portion of catholyte;
4. evaporating and thereby cooling said second portion of the catholyte in said evaporator to a selected concentration and temperature;



5. collecting a first fraction of said second portion of the catholyte as a final product;
6. circulating a second fraction of said second portion of the catholyte through said heat exchanger where it is heated by the heat values of said first portion of the catholyte and thereby reheated; and
7. returning the reheated second fraction to said evaporator;

the liquid flow in Steps 1 through 7 being maintained at a rate such that:

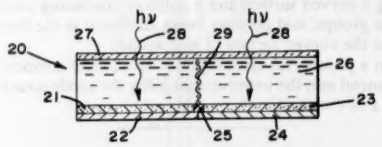
a. the temperature of the catholyte in the cathode compartment is from 50° C to 120° C;
b. the concentration of alkali metal hydroxide of the catholyte is from 15% to 35%;
c. the volume of liquid to be concentrated in the evaporator is substantially constant.

4,090,933

PHOTOELECTROLYSIS OF WATER BY SOLAR RADIATION

Arthur J. Nozik, Summit, N.J., assignor to Allied Chemical Corporation, Morris Township, N.J.

Continuation-in-part of Ser. No. 632,557, Nov. 17, 1975, Pat. No. 4,011,149. This application Nov. 26, 1976, Ser. No. 745,030
Int. Cl.[2] C25B *1/04;* H01M *6/30*
U.S. Cl. 204—129 **51 Claims**



1. A photoelectrolysis cell for producing hydrogen using solar radiation comprising

(a) an anodic electrode comprising at least one n-type semiconducting layer which has a bandgap ranging from about 0.5 to 4.0 eV and which is disposed on a supporting conductive substrate;
(b) a cathodic counter-electrode comprising at least one p-type semiconducting layer which has a bandgap ranging from about 0.5 to 4.0 eV and which is disposed on a supporting conductive substrate, the p-type layer adjacent the n-type layer, with the n-type and p-type layers being either coplanar or disposed semicylindrically on an elongated, cylindrical substrate such that incident solar radiation impinges substantially simultaneously on both the n-type and p-type electrodes;
(c) means for retaining an electrolyte in contact with the exposed surfaces of the n- and p-type semiconducting electrodes;
(d) external bias means between the electrode and the counter-electrode for anodically biasing the anodic electrode relative to the cathodic counter-electrode with 0 to about 1 V; and
(e) means for collecting hydrogen produced at the anodic electrode.

10. The cell of claim 1 in which the electrode and counter-electrode are in the form of films of about 500 A to 10 μm in thickness.

28. A photoelectrolysis cell for producing hydrogen using solar radiation comprising

(a) an anodic electrode comprising at least one porous n-type semiconducting layer which has a bandgap ranging from about 0.5 to 4.0 eV;
(b) a cathodic counter-electrode comprising at least one porous p-type semiconducting layer which has a bandgap ranging from about 0.5 to 4.0 eV, with the n- and p-type layers either having an electrical conductivity of at least about 1 $ohm^{-1}cm^{-1}$ or supported on electrically conducting porous substrates;
(c) an opaque solid polymer electrolyte film interposed between the n-type and p-type semiconducting electrodes;
(d) means for retaining water in contact with the exposed surfaces of the n- and p-type semiconducting electrodes;
(e) external bias means between the electrode and the counter-electrode for anodically biasing the anodic electrode relative to the cathodic counter-electrode with 0 to about 1 V;
(f) means for directing the solar radiation onto at least a portion of the electrodes; and
(g) means for collecting hydrogen produced at the cathodic counter-electrode.

4,090,934

GOLD PLATING WITH ELECTROCHEMICAL PASSIVATION

Roy Joseph Chesseri, North Plainfield, and Yutaka Okinaka, Madison, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jul. 22, 1977, Ser. No. 817,903
Int. Cl.[2] C25D *11/34*
U.S. Cl. 204—140 **8 Claims**

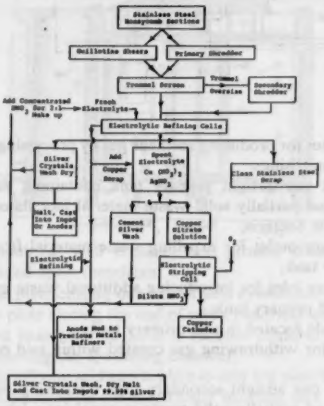
1. A process for producing an article with at least one passivated layer said layer consisting of at least 90 percent by weight of gold on a metallic surface consisting of at least 95 percent by weight of nickel said process comprising the step of passing current through an anode and aqueous solution and a cathode with both cathode and anode at least partially immersed in the aqueous solution and in which the anode includes the metallic surface with the layer characterized in that the aqueous solution consists essentially of an aqueous solution of alkali-metal

hydroxide with a pH greater than 7 so as to decrease the effective porosity of the layer as evidenced by decreased number of spots in an electrographic porosity test using dimethylglyoxime as the indicator.

4,090,935
PROCESS FOR RECOVERING SILVER, COPPER AND STAINLESS STEEL FROM SILVER BRAZED STAINLESS STEEL SECTIONS

Beverly W. Dunning, Jr., Adelphi, and D. Harry Chambers, Catonsville, both of Md., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Jul. 12, 1977, Ser. No. 814,959
Int. Cl.² C25F 5/00; C25C 1/00, 1/12
U.S. Cl. 204—146 **14 Claims**



1. A process for recovering silver, copper and stainless steel from sections of military aircraft comprising stainless steel sections wherein countoured outer sections and inner sections of honeycomb configuration are brazed together with silver based brazing compound, the process comprising the steps of:

I. Comminuting the articles to obtain sections with exposed brazed joints,

II. Placing the sections obtained in step I in an anode basket in an electrolytic refining cell comprising an anode basket, a cathode and an electrolyte,

III. Passing a direct current through the refining cell whereby silver crystals are deposited on the cathode, copper is left in the electrolyte and stainless steel is left in the anode basket,

IV. Purifying the silver crystals,

V. Electrolytically depositing the copper from the spent electrolyte,

VI. Washing and drying the stainless steel left in the anode basket.

4,090,936
PHOTOHARDENABLE COMPOSITIONS

Robert W. Barton, Cottage Grove, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Oct. 28, 1976, Ser. No. 736,540
Int. Cl.² C08F 2/50, 4/00
U.S. Cl. 204—159.18 **9 Claims**

1. A photohardenable, liquid composition comprising:

(a) an organic compound having an average epoxide functionally in the range of about 1 to 1.3;

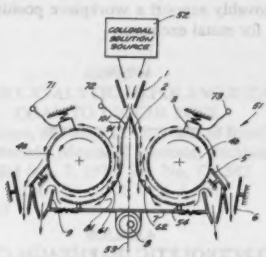
(b) an organic polymer which is compatible with said organic compound, said polymer having a glass transition temperature in the range of about −20° C. to 105° C. and being selected from (i) polymers derived from at least one acrylate or methacrylate monomer, (ii) copolymers of styrene and allyl alcohol, and (iii) polyvinyl butyral polymers; said polymer being present in an amount of about 3% to about 50% by weight based on the weight of said organic compound; and

(c) an effective amount of an aromatic complex salt photoinitiator selected from an onium salt of a Group VA element, and onium salt of a Group VI A element, and an aromatic halonium salt.

4,090,937
ELECTROPHORETIC TECHNIQUE FOR VARYING THE CONCENTRATION OF A COLLOIDAL SOLUTION

Stoycho Mitrev Stoev; Yordan Vladimirov Vuchev; Lyubomir Vladimirov Kuzev, and Georgi Petrov Atzinov, all of Sofia, Bulgaria, assignors to Vish Minno-Geoloshki Institute, Sofia, Bulgaria

Filed Jul. 28, 1976, Ser. No. 709,396
Int. Cl.² B01D 13/02
U.S. Cl. 204—180 R **4 Claims**



1. In a method for electrophoretically varying the concentration of a colloidal solution by displacement of an electrically-influenceable phase thereof, the method comprising the step of passing the solution through a prescribed path while subjecting the said phase to an electric field to separate the said phase from the remaining concentrate of the solution, the improvement comprising the step of continuously imparting a vibratory motion to the solution along the prescribed path during the application of the electric field.

4,090,938
APPARATUS FOR PLATING

Charles Douglas Eidschun, Jr., Seminole, Fla., assignor to Dixie Plating, Inc, St. Petersburg, Fla.

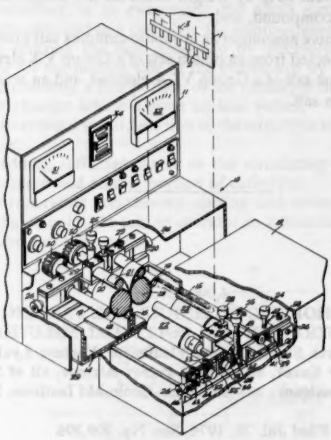
Division of Ser. No. 580,304, May 23, 1975, Pat. No. 4,036,705, which is a continuation-in-part of Ser. No. 502,536, Sep. 3, 1974, abandoned. This application Feb. 3, 1977, Ser. No. 765,155
Int. Cl.² C25D 5/02, 5/06
U.S. Cl. 204—224 R **28 Claims**

1. An apparatus for metal exchange comprising, in combination,

a pair of horizontally opposed electrolyte transfer rollers,

means for drivingly rotating said rollers,

an electrolytic transfer surface provided on said rollers, an electrolyte source positioned beneath the rollers,



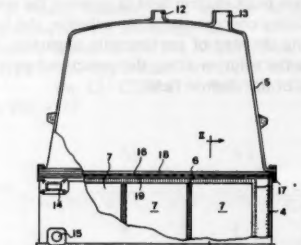
and jig means beneath the center position below the rollers to immovably support a workpiece positioned vertically therein for metal exchange.

4,090,939

ELECTROLYTIC DIAPHRAGM CELL

Edgard Nicolas, and Louis Bourgeois, both of Brussels, Belgium, assignors to Solvay & Cie, Belgium

Filed Jan. 9, 1976, Ser. No. 647,751
Claims priority, application France, Jan. 20, 1975, 75 01873
Int. Cl.[2] C25B *1/16, 1/26, 11/06*
U.S. Cl. 204—258 **19 Claims**



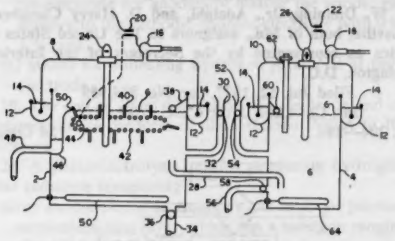
1. Diaphragm cell for the electrolysis of an aqueous solution of alkali metal chloride, comprising a chamber divided by a diaphragm into an anode compartment containing at least one anode having a surface effective for discharging chloride ions during operation of the cell and a cathode compartment containing at least one cathode, characterized in that the cell also comprises, in the anode compartment, a catalytic surface different from said effective anode surface made of a material which catalyses the decomposition of hypochlorite ions.

4,090,940

APPARATUS FOR PRODUCING METHANE GAS BY PROCESSING WASTE MATERIALS

Harold Switzgable, Monmouth Junction, N.J., assignor to Alpha Systems Corporation, Monmouth Junction, N.J.

Division of Ser. No. 499,751, Aug. 22, 1974, abandoned. This application Jan. 23, 1976, Ser. No. 651,982
Int. Cl.[2] C02B *5/12;* **C25B** *3/02, 9/00*
U.S. Cl. 204—278 **30 Claims**



1. Apparatus for producing methane gas by processing waste materials comprising:

a. at least one airtight primary tank containing partially liquid and partially solid waste material inoculated with anaerobic bacteria;

b. a primary outlet for expelling waste material from said primary tank;

c. a primary inlet for introducing additional waste material into said primary tank;

d. a cathode located in said primary tank;

e. means for withdrawing gas created within said primary tank;

f. at least one airtight secondary tank containing partially liquid and partially solid waste material inoculated with anaerobic bacteria;

g. a secondary outlet for expelling waste material from said secondary tank;

h. a secondary inlet for introducing additional waste material;

i. an anode located in said secondary tank;

j. means for withdrawing gas created within said secondary tank;

k. a conduit providing fluid flow communication between waste material in said primary tank and waste material in said secondary tank; and

l. means for removing non-processible and processed waste material from said primary tank.

4,090,941

CATHODE SPUTTERING APPARATUS

Robert Joseph Wright, Tequesta; James Roy Mullaly, Palm Beach Gardens, and Ralph Julius Hecht, West Palm Beach, all of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Mar. 18, 1977, Ser. No. 779,201
Int. Cl.[2] C23C *15/00*
U.S. Cl. 204—298 **9 Claims**

1. Cathode sputtering apparatus for depositing a coating on an underlying substrate, comprising:

a center, post cathode adapted to have a layer of coating material adhered to the outer surface thereof and having an internal reservoir through which a cooling medium is flowable during operation of the apparatus;

a hollow, cylindrical cathode disposed concentrically about said post cathode forming an annular sputtering chamber therebetween, said cylindrical cathode adapted to have a layer of coating material adhered to the interior surface thereof and having internal passages through which a

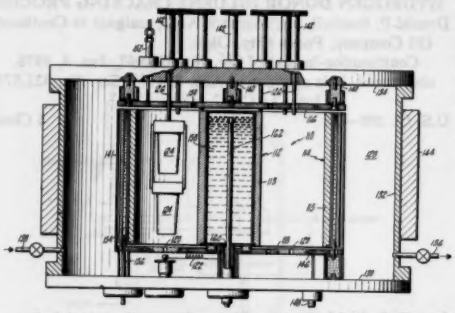
cooling medium is flowable during operation of the apparatus;

an anode plate disposed at one end of said annular sputtering chamber;

a cylindrical ground shield encasing said cylindrical cathode and spaced closely apart therefrom;

a ground plate disposed at the end of said annular chamber opposing the anode plate end wherein said ground plate is in electrical communication with said ground shield and wherein said ground plate has a plurality of apertures therein;

means for discharging electrons through the apertures in said ground plate and into the sputtering chamber;



a cylindrical wall encasing said ground shield shell and spaced apart therefrom;

a base plate closing one end of said cylindrical wall;

a top plate closing the end of said cylindrical wall opposing said base plate to form a vacuum chamber completely enclosing the sputtering chamber;

means affixing said anode plate to said top plate including an anode insulator for electrically isolating said anode plate from said ground plate;

means affixed to said top plate for supporting a substrate article to be coated within said annular sputtering chamber wherein said anode plate, top plate, and substrate article are jointly detachable from the apparatus.

4,090,942

PROCESS FOR PRODUCING BENZENE

Harold Beuther, Gibsonia, and Angelo A. Montagna, Monroeville, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 688,106, May 19, 1976, abandoned. This application Oct. 29, 1976, Ser. No. 736,841

Int. Cl.[2] C10G *1/00*

U.S. Cl. 208—8 **2 Claims**

1. A process for preparing benzene from coal liquids obtained from the hydrogenation of coal boiling above about 200° C. containing at least about 30 weight per cent aromatics, of which at least about 40 weight per cent are polynuclear aromatic compounds, condensed (fused) as well as non-condensed, and whose hydrogen to carbon atomic ratio is in the range of about 0.8:1 to about 1.05:1, which consists essentially in heating such coal liquids, together with hydrogen, in a noncatalytic bed at least to a temperature of about 700° C. while maintaining an average reaction temperature of about 650° to about 1100° C., a total pressure of about 800 to about 2500 pounds per square inch gauge, a hydrogen partial pressure of about 500 to about 2000 pounds per square inch gauge, with the hydrogen ratio being at least about 0.50 and a residence time of three to about 120 seconds, and thereafter recovering benzene from the reaction product.

4,090,943

COAL HYDROGENATION CATALYST RECYCLE

Norman G. Moll, Sanford, and George J. Quarderer, Midland, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 28, 1977, Ser. No. 772,873

Int. Cl.[2] C10G *1/08*

U.S. Cl. 208—10 **9 Claims**

1. In the process wherein a slurry of coal in a hydrocarbon oil is reacted with hydrogen at elevated temperature and pressure in the presence of a dispersed metal-containing hydrogenation catalyst to produce a largely liquid product containing suspended particles of ash and said catalyst, the improvement wherein the hydrogenation catalyst is provided in the form of particles substantially smaller in average diameter than the particles of ash, subjecting said liquid product to a gravity concentration process, thereby forming an upper oil layer having suspended therein a comparatively large proportion of the catalyst particles and a lower heavy layer containing a major proportion of the ash particles, separating said upper layer from said lower layer, and recycling at least a portion of said upper layer containing suspended catalyst particles to the coal hydrogenation process.

4,090,944

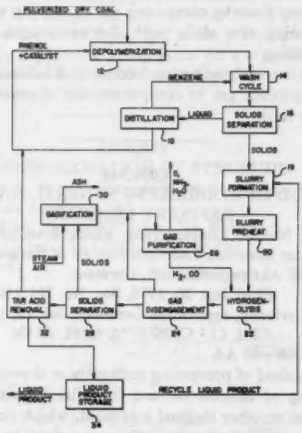
PROCESS FOR CATALYTIC DEPOLYMERIZATION OF COAL TO LIQUID FUEL

Raymond H. Moore, and John L. Cox, both of Richland, Wash., assignors to Battelle Memorial Institute, Richland, Wash.

Filed Sep. 7, 1976, Ser. No. 720,582

Int. Cl.[2] C10G *1/06, 1/08*

U.S. Cl. 208—10 **12 Claims**



1. A process for converting solid, hydrocarbonaceous material into liquid hydrocarbon products which comprises:

reacting a solid, hydrocarbonaceous material with a phenolic material in the presence of a Bronsted acid catalyst selected from the group consisting of CF_3SO_3H and CH_3SO_3H at elevated temperature and pressure to at least partly depolymerize said solid, hydrocarbonaceous material to produce a liquid extract; and

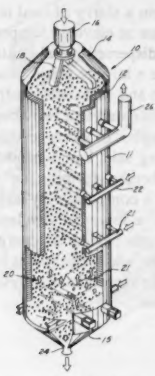
hydrogenolyzing said extract to produce liquid hydrocarbon products.

4,090,945

METHOD OF OPERATING AN OIL SHALE KILN

Adam A. Reeves, Rifle, Colo., assignor to Paraho Corporation, Grand Junction, Colo.

Filed Mar. 25, 1977, Ser. No. 781,072
Int. Cl.[2] C10G *1/02*
U.S. Cl. 208—11 R 6 Claims



1. A process for the continuous retorting of oil shale in a kiln having an inlet for particulate raw shale, an outlet for retorted shale, inlet means for process gas, and outlet means for gas entrained products of retorting, comprising:

(a) continuously feeding particulate raw shale into the kiln;

(b) continuously determining the bulk density of the raw shale by correlating the volume of incoming raw shale with its weight;

(c) continuously passing gamma radiation through incoming raw shale and detecting variations in a gamma ray detector;

(d) continuously determining specific gravity of the incoming raw shale by comparing the continuous weight of the incoming raw shale with the continuous gamma ray screening;

(e) and currently adjusting feed rates of incoming raw shale and process gas to compensate for changes in the raw shale feed.

4,090,946

METHOD OF STABILIZING MINERAL OIL AND ITS REFINERY PRODUCTS

Guenther Nottes, Limburgerhof; Klaus Bronstert, Carlsberg, and Peter Klaerner, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Germany

Filed Jun. 30, 1976, Ser. No. 701,116
Claims priority, application Germany, Jul. 12, 1975, 2531234
Int. Cl.[2] C10G *9/16;* C10L *10/04*
U.S. Cl. 208—48 AA 2 Claims

1. A method of preventing sediments or deposits during the processing of mineral oil and its refinery products during distillation or other thermal treatment, which comprises adding to the mineral oil or its refinery products to be thermally treated

(a) 10 to 50 ppm dicyclohexylamine, and

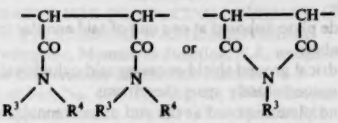
(b) about 20 to 200 ppm of an alternating copolymer of the type

. . . A—B—A—B—A . . .

in which A denotes the structural unit

$$-C(CH_3)_2-CH_2-$$

originating from isobutene and in which B stands for structural units of the formulae



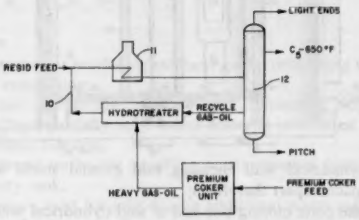
in which R^3 is alkyl of 8 to 20 carbon atoms and R^4 is hydrogen or alkyl of 8 to 20 carbon atoms, said copolymer having an average degree of polymerization of from 20 to 50 units AB.

4,090,947

HYDROGEN DONOR DILUENT CRACKING PROCESS

Donald P. Satchell, Jr., Morenci, Ariz., assignor to Continental Oil Company, Ponca City, Okla.

Continuation-in-part of Ser. No. 693,047, Jun. 4, 1976, abandoned. This application Aug. 8, 1977, Ser. No. 822,573
Int. Cl.[2] C10G *13/22, 37/02*
U.S. Cl. 208—56 8 Claims



1. In a thermal cracking process for converting heavy petroleum residual oil to lighter distillate products in which the thermal cracking of the residual oil takes place in the presence of a hydrogen donor diluent, the improvement wherein the hydrogen donor diluent comprises hydrotreated heavy premium coker gas-oil produced in a premium coking operation utilizing a coke drum pressure of from 10 to 150 psig, a coker furnace transfer line temperature of from 900° to 960° F and a coke drum overhead vapor temperature of from 825° to 900° F and operated at conditions such that the coke produced has a coefficient of thermal expansion of about 5 times 10^{-7}/° C or less.

4,090,948

CATALYTIC CRACKING PROCESS

Eugene F. Schwarzenbek, 3 Seacrest Dr., Lavallette, N.J. 08735

Filed Jan. 17, 1977, Ser. No. 760,247
Int. Cl.[2] B01J *8/24;* C10G *37/02, 11/04*
U.S. Cl. 208—74 10 Claims

1. A fluid catalytic cracking process in which the virgin hydrocarbon feed is contacted in succession with a recycled spent catalyst prior to any contact with regenerated catalyst and then without separation of recycled spent catalyst and oil contact with a freshly regenerated catalyst to produce an improved yield structure, which process comprises the steps of:

a. contacting a hydrocarbon feed in a primary short time dilute phase riser reaction zone with a recycled spent catalyst stream from a spent catalyst stripping zone in an amount sufficient to vaporize the oil feed and deposit nitrogen and carbon residue type contaminants in the feed on the spent catalyst;

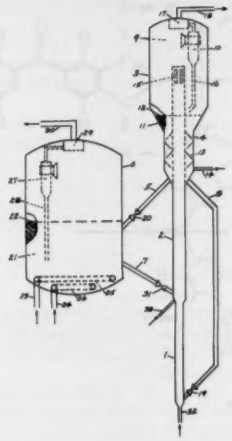
b. passing the feed and spent catalyst in admixture to a secondary riser reaction zone where freshly regenerated catalyst is added in an amount sufficient to obtain the desired conversion of and yield and quality of products from the oil feed;

c. discharging the mixture into a separation zone to effect

separation of the products and unreacted feed from the spent catalyst;

d. recovering product and unreacted feed and passing spent catalyst from said separation means into a spent catalyst stripping zone to remove absorbed and interstitial hydrocarbons to form stripped spent catalyst containing coke;

e. passing a portion of stripped spent catalyst from the stripping zone to the primary reaction zone as the recycle spent catalyst stream of step (a) above at a rate sufficient to vaporize the oil feed and deposit nitrogen and carbon



residue type contaminants in the feed on the recycled spent catalyst;

f. passing simultaneously a second portion of stripped spent catalyst from the stripping zone into a regeneration zone wherein coke is oxidized from the said catalyst to produce freshly regenerated catalyst;

g. passing freshly regenerated catalyst from said regeneration zone to the secondary reaction zone of step (b) above at a rate sufficient to obtain the desired conversion of and yield and quality of products from the oil feed.

4,090,949

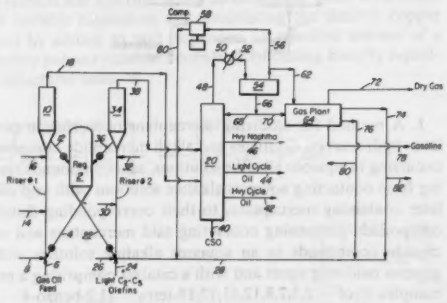
UPGRADING OF OLEFINIC GASOLINE WITH HYDROGEN CONTRIBUTORS

Hartley Owen, Belle Mead, and Paul B. Venuto, Cherry Hill, both of N.J., assignors to Mobil Oil Corportion, New York, N.Y.

Continuation of Ser. No. 493,300, Jul. 31, 1974, abandoned. This application Nov. 4, 1976, Ser. No. 738,913

Int. Cl.[2] C07C *15/02*; B01J *8/24*; C01B *29/12*

U.S. Cl. 208—78 **10 Claims**



1. A method for upgrading poor quality olefinic gasoline including hydrocarbons in the range of C_5 to C_{12} carbon number which comprises:

upgrading said olefinic gasoline mixed with a material selected from the group consisting of C_5- olefinic gases, alcohols, ketones, ethers and mixtures thereof by contact with mordenite crystalline zeolite conversion catalysts in combination with a zeolite selected from the group consisting of faujasite and ZSM-5 crystalline zeolite; and

effecting said contacting at a pressure below 200 psig and a temperature within the range of 500 to 1100° F.

4,090,950

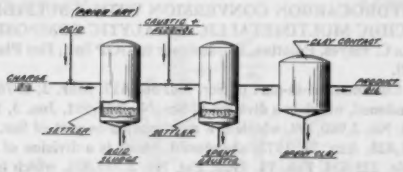
PROCESS FOR MANUFACTURING REFRIGERATION OILS

Ronald W. Reynolds, Wilmington, Del., assignor to Sun Petroleum Products Company, Philadelphia, Pa.

Filed Apr. 26, 1977, Ser. No. 791,094

Int. Cl.[2] C10G *23/02, 13/02, 25/00*

U.S. Cl. 208—89 **4 Claims**



1. A process for making refrigeration oils without acid treating and clay contacting steps which comprises subjecting a high aromatic, low wax naphthenic oil to a first hydrogenating step at a temperature of from about 550° to 660° F, a hydrogen pressure of from about 500 to about 1500 psig, and in the presence of a nickel-molybdenum or cobalt-molybdenum catalyst, stripping out H_2S and NH_3 from the hydrogenated oil from said first hydrogenating step, subjecting the hydrogenated oil to a second hydrogenating step with the same catalyst as in said first hydrogenating step and under the same conditions, catalytically dewaxing by hydrocracking the twice hydrogenated oil at a temperature of 525° F to 775° F at a hydrogen pressure of 200 to 1500 psig and in the presence of a catalyst comprising a platinum group metal on a crystalline mordenite of reduced alkali metal content, and percolating the dewaxed oil through bauxite.

4,090,951

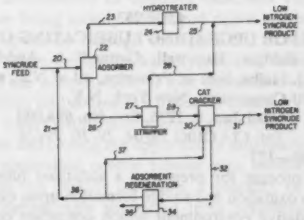
DENITROGENATION OF SYNCRUDE

Robert H. Smith, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jun. 6, 1977, Ser. No. 803,833

Int. Cl.[2] C10G *25/12, 23/00*

U.S. Cl. 208—91 **5 Claims**



1. A method for reducing the nitrogen content of a syncrude feed obtained from at least one of oil shale, tar sands, and coal, comprising mixing an adsorbent with said feed, said adsorbent being effective for and being employed in an amount effective to adsorb nitrogen materials from said syncrude feed and also

to serve as a catalytic cracking catalyst for said syncrude feed, settling said mixture to form a first phase composed essentially of a low nitrogen syncrude material, and a second phase composed of said adsorbent and high nitrogen syncrude feed, separating said first and second phases from one another, hydrotreating said first phase to reduce the nitrogen content of said low nitrogen material, stripping low nitrogen syncrude material from said second phase, combining said material stripped from said second phase with said hydrotreated low nitrogen material to form a first low nitrogen syncrude product catalytically cracking said stripped second phase to produce a second low nitrogen syncrude product, recovering adsorbent from said cracking step, regenerating said recovered adsorbent by heating same at a temperature of at least 1000° F in the presence of air or oxygen to drive off nitrogen compounds and burn off at least part of the carbon previously deposited on said adsorbent, and reusing at least part of said regenerated adsorbent in the process.

4,090,952

HYDROCARBON CONVERSION WITH A SULFIDED ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

John C. Hayes, Palatine, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 663,417, Mar. 3, 1976, abandoned, which is a division of Ser. No. 475,691, Jun. 3, 1974, Pat. No. 3,960,709, which is a continuation-in-part of Ser. No. 391,428, Aug. 24, 1973, abandoned, which is a division of Ser. No. 225,634, Feb. 11, 1972, Pat. No. 3,775,301, which is a division of Ser. No. 839,086, Jul. 3, 1969, abandoned. This application Nov. 22, 1976, Ser. No. 744,206

The portion of the term of this patent subsequent to Jun. 1, 1993, has been disclaimed.

Int. Cl.[2] C07C *35/08*

U.S. Cl. 208—139 **16 Claims**

1. A process for converting a hydrocarbon which comprises contacting the hydrocarbon at hydrocarbon conversion conditions with a sulfided acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum or palladium, about 0.01 to about 2 wt. % rhodium, about 0.01 to about 5 wt. % germanium, about 0.1 to about 3.5 wt. % halogen, and about 0.01 to about 1 wt. % sulfur; wherein the platinum or palladium, rhodium and germanium are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum or palladium and rhodium are present in a sulfided state or in a mixture of the sulfided state and the elemental metallic state; wherein substantially all of the germanium is present in an oxidation state above that of the elemental metal; and wherein the composite has been sulfided, prior to contact with the hydrocarbon and after substantially all of the platinum or palladium and rhodium contained therein have been reduced to the elemental metallic state, by treatment with a sulfiding gas at conditions selected to incorporate about 0.01 to about 1 wt. % sulfur.

4,090,953

PROCESS FOR UPGRADING LUBRICATING OIL STOCK

Robert F. Bridger, Hopewell; Costandi A. Audeh, and El-Ahmadi I. Heiba, both of Princeton, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jun. 8, 1976, Ser. No. 694,003

Int. Cl.[2] C10G *29/04, 29/10, 29/16*

U.S. Cl. 208—177 **6 Claims**

1. In a process for preparing a stabilized lubricating oil resistant to oxidation and sludge formation upon exposure to a highly oxidative environment which comprises contacting a hydrocarbon fraction lubricating oil stock boiling above about 600° F with added elemental sulfur, said contacting in the presence of a catalyst material selected from the group consisting of alumina, aluminosilicate, a metal of Groups II-A, II-B, VI-B or VIII of the Periodic Table of Elements, an oxide of a metal of Groups II-A, II-B, VI-B or VIII, a sulfide of a metal of Groups II-A, II-B, VI-B or VIII, clay, silica, silica combined with an oxide of a metal of Groups II-A, III-A, IV-B or V-B, and combinations thereof at a reaction temperature of from about 150° to about 225° C and a reaction pressure of from about 0 psig to about 500 psig, the improvement which comprises conducting said contacting in a flow reactor at a liquid hourly space velocity of from about 0.5 hr^{-1} to about 20 hr^{-1} wherein said elemental sulfur is added in an amount of from about 0.025 to about 0.2 percent by weight of said oil stock.

4,090,954

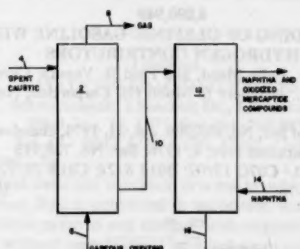
METHOD FOR OXIDIZING MERCAPTANS AND MERCAPTIDE COMPOUNDS FROM AQUEOUS ALKALINE SOLUTIONS AND HYDROCARBON DISTILLATES

Clifford Ward, Louisa, Ky., assignor to Ashland Oil, Inc., Ashland, Ky.

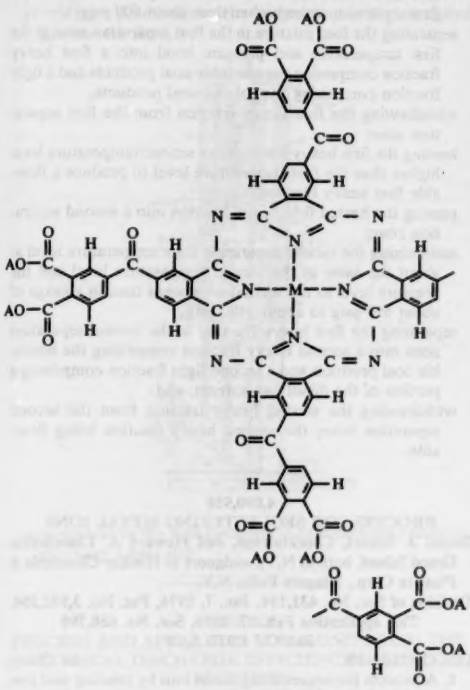
Filed Dec. 22, 1976, Ser. No. 753,400

Int. Cl.[2] C10G *27/06*

U.S. Cl. 208—206 **17 Claims**



1. A method for oxidizing mercaptans occurring in petroleum hydrocarbon distillates and alkali mercaptide compounds occurring in aqueous alkaline solutions, said compounds resulting from contacting aqueous alkaline solutions with said distillates containing mercaptans, to their corresponding disulfide compounds comprising contacting said mercaptans and mercaptide compounds in an aqueous alkaline solution with a gaseous oxidizing agent and with a catalyst comprising a metal complex of 2,3,7,8,12,13,17,18-tetra [1,2-benzo-4 (4'-phthaloyl)]—porphyrazine-2,22,23,24-tetraene, or a substituted derivative thereof having the structural formula:



where M is a metal selected from the group consisting of iron, manganese, chromium, magnesium, copper, nickel, zinc, titanium, hafnium, thorium, tin, lead, columbium, tantalum, antimony, bismuth, molybdenum, palladium, platinum, silver, mercury, vanadium and cobalt and A is hydrogen or an alkali metal.

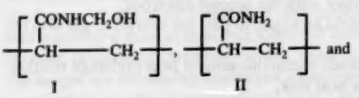
4,090,955

SELECTIVE FLOCCULATION OF MINERALS FROM A MIXTURE OR AN ORE

Robin William Dexter, Ilkley, and Douglas Rusling, Bradford, both of England, assignors to American Cyanamid Company, Stamford, Conn.

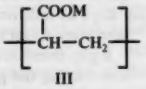
Filed May 5, 1976, Ser. No. 683,349
Int. Cl.² B03B *1/04*
U.S. Cl. 209—5 **5 Claims**

1. A process for selectively flocculating copper values while excluding dolomite, silica, or silica/quartz from an ore containing same which comprises: (1) preparing a dispersion of the ore at a particle size less than about 10 microns in water with an aid of a suitable dispersant; (2) flocculating the desired copper values by adding to said dispersion an effective amount of a selective polyacrylamide flocculant containing linearly repeating structural units of:



I

II



III

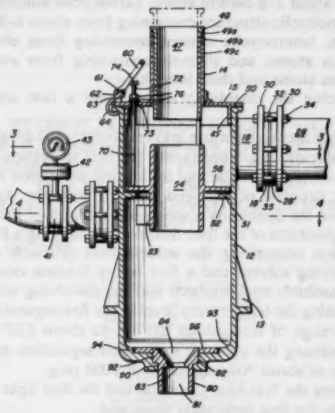
wherein the units designated I and II comprise from about 50 to 100 mol percent of the total mol content of said polyacrylamide; the units designated III comprise from 0 to about 40 mol percent of the total mol content of said polyacrylamide; the units designated I comprise from about 20 to 87 mol percent of the total mols of units I and II in said polyacrylamide; M represents methyl, hydrogen, ammonium or an alkali metal ion; and the total molar content of said polyacrylamide is such as to provide a polymer which has a 0.10 weight percent solution in 1M NaCl at 25° C. as a viscosity in the range of about 2.0 to 5.0 centipoises when the units designated I are present as units designated II; and (3) thereafter recovering the flocculated copper values.

4,090,956

HYDROCYCLONE

William Benzon, Center Valley, Pa., assignor to Wilmot Engineering Co., White Haven, Pa.

Filed Sep. 2, 1976, Ser. No. 720,075
Int. Cl.² B04C *5/12, 5/14*
U.S. Cl. 209—211 **8 Claims**



1. A hydrocyclone including a vessel defining a generally cylindrical interior having upper and lower ends, said vessel including a bottom closing the lower end of said interior and defining a central outlet opening formed therethrough, fluid inlet means opening tangentially into said interior intermediate said upper and lower ends, an upwardly facing inwardly projecting annular abutment surface extending about said interior above said inlet means, and an outlet opening laterally outwardly of said interior above said abutment surface and below said upper end, a hollow cylindrical vortex finder including an outwardly projecting circumferential shoulder extending thereabout intermediate its opposite ends, said vortex finder and shoulder being loosely telescoped down into and readily removable upwardly through the upper end of said interior, said vortex finder being substantially centered in said interior and having the undersurface of said shoulder overlying and supported from said abutment surface for stationary support of said vortex finder within said interior, a top readily removably secured over and closing the upper end of said interior, said top having an upstanding central tubular pipe member attached thereto, said top further including a plurality of elongated abutments dependently supported from peripherally spaced portions of said top and spaced about said tubular pipe member pipe, said abutments projecting downwardly into said interior about said vortex finder and having lower end portions downwardly abutted against said shoulder to maintain the latter and thus said vortex finder in position against shifting relative to said abutment and vessel.

4,090,957

SYSTEM FOR SEPARATING SOLUBLE AND INSOLUBLE COAL PRODUCTS FROM A FEED MIXTURE

Robert E. Leonard, Oklahoma City, Okla., assignor to Kerr-McGee Corporation, Oklahoma City, Okla.

Filed Jun. 1, 1976, Ser. No. 691,578
Int. Cl.[2] B01D *21/00*
U.S. Cl. 210—54 11 Claims

1. A process comprising:

providing a feed mixture comprising insoluble coal products and soluble coal products;

providing a dissolving solvent consisting essentially of at least one substance having a critical temperature below 800° F. selected from the group consisting of aromatic hydrocarbons having a single benzene nucleus and normal boiling points below about 310° F., cycloparaffin hydrocarbons having normal boiling points below about 310° F., open chain mono-olefin hydrocarbons having normal boiling points below about 310° F., open chain saturated hydrocarbons having normal boiling points below about 310° F., mono-, di, and tri-open chain amines containing from about 2–8 carbon atoms, carbocyclic amines having a monocyclic structure containing from about 6–9 carbon atoms, heterocyclic amines containing from about 5–9 carbon atoms, and phenols containing from about 6–9 carbon atoms and their homologs;

introducing the dissolving solvent into a first separation zone;

dispersing the feed mixture into relatively small droplets and introducing said droplets into the first separation zone;

countercurrently contacting in the first separation zone the small droplets of the feed mixture with the dissolving solvent for dissolving a substantial portion of the soluble coal products of the feed mixture and forming a first light fraction comprising the soluble coal products and the dissolving solvent and a first heavy fraction comprising the insoluble coal products and the dissolving solvent;

maintaining the temperature level in the first separation zone in a range of from about 525° F. to about 630° F., and maintaining the pressure in the first separation zone in a range of about 700 psig to about 1000 psig;

separating the first heavy fraction and the first light fraction within the first separation zone; and

withdrawing the first light fraction from the first separation zone.

4,090,958

COAL PROCESSING SYSTEM FOR PRODUCING A STREAM OF FLOWABLE INSOLUBLE COAL PRODUCTS

Robert Edward Leonard, Oklahoma City, Okla., assignor to Kerr-McGee Corporation, Oklahoma City, Okla.

Filed Feb. 23, 1976, Ser. No. 660,334
Int. Cl.[2] B01D *21/00*
U.S. Cl. 210—54 10 Claims

1. A process comprising: providing a feed mixture comprising a dissolving solvent, insoluble coal products and soluble coal products, said dissolving solvent consisting essentially of at least one substance having a critical temperature below 800° F. selected from the group consisting of aromatic hydrocarbons having a single benzene nucleus and normal boiling points below about 310° F., cycloparaffin hydrocarbons having normal boiling points below about 310° F., open chain mono-olefin hydrocarbons having normal boiling points below about 310° F., open chain saturated hydrocarbons having normal boiling points below about 310° F., mono-, di, and tri-open chain amines containing from about 2–8 carbon atoms, carbocyclic amines having a monocyclic structure containing from about 6–9 carbon atoms, heterocyclic amines containing from about 5–9 carbon atoms, and phenols containing from about 6–9 carbon atoms and their homologs;

introducing the feed mixture into a first separation zone;

maintaining the first separation zone at a first temperature level lower than about 680° F. and the pressure level in the first separation zone higher than about 600 psig;

separating the feed mixture in the first separation zone at the first temperature and pressure level into a first heavy fraction comprising the insoluble coal products and a light fraction comprising the soluble coal products;

withdrawing the first heavy fraction from the first separation zone;

heating the first heavy fraction to a second temperature level higher than the first temperature level to produce a flowable first heavy fraction;

passing the heated first heavy fraction into a second separation zone;

maintaining the second separation zone temperature level at about the same as the second temperature level and the pressure level in the second separation zone in a range of about 690 psig to about 1490 psig;

separating the first heavy fraction in the second separation zone into a second heavy fraction comprising the insoluble coal products and a second light fraction comprising a portion of the dissolving solvent; and

withdrawing the second heavy fraction from the second separation zone, the second heavy fraction being flowable.

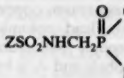
4,090,959

PROCESS FOR SEQUESTERING METAL IONS

Daniel J. Scharf, Checktowaga, and Howard A. Chamberlin, Grand Island, both of N.Y., assignors to Hooker Chemicals & Plastics Corp., Niagara Falls, N.Y.

Division of Ser. No. 431,194, Jan. 7, 1974, Pat. No. 3,992,294.
This application Feb. 17, 1976, Ser. No. 658,798
Int. Cl.[2] C02B *5/06*
U.S. Cl. 210—58 16 Claims

1. A process for sequestering metal ions by treating said ions with a compound of the formula:



wherein R′ is selected from the group consisting of ⁻OH, alkyloxy and aryloxy; and Z is ⁻OH, alkyl, aryl, alkoxy and aryloxy.

4,090,960

GAS ENERGIZING APPARATUS AND RELATED METHOD

Herbert W. Cooper, Jericho, N.Y., assignor to Dynalytics Corporation, Hicksville, N.Y.

Filed May 8, 1974, Ser. No. 467,876
Int. Cl.[2] C02B *1/38;* C01B *13/10*
U.S. Cl. 210—63 Z 22 Claims

1. An apparatus comprising in combination:

a first and a second electrode spaced apart to form a gap therebetween,

means for introducing a gas into the gap,

each of the electrodes connected with an opposite pole of a high voltage source to energize the gas in the gap,

a fluid in contact with the second electrode,

a porous material arranged to pass the energized gas into the fluid,

the first electrode communicating in heat exchange relationship with a heat sink.

15. A method for producing an energized gas and comprising steps as follows:

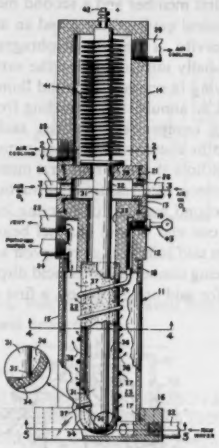
providing a first and a second electrode spaced apart to form a gap therebetween,

introducing the gas nonenergized into the gap,

connecting each of the electrodes with an opposite pole of a high voltage source to energize the gas in the gap,

passing a fluid in contact with the second electrode,

providing a porous material arranged to pass the energized gas into the fluid,



communicating the first electrode in heat exchange relationship with a heat sink.

4,090,961

PROCESS AND APPARATUS FOR MONITORING THE ELECTRICAL DISCHARGE EFFICIENCY OF AN EDM MACHINE

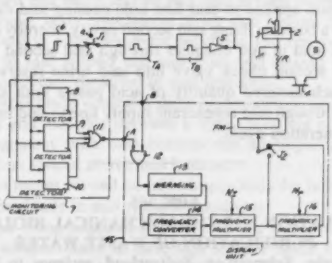
Heinz Rhyner; Francois Balleys, and Georges-Andre Marendaz, all of Geneva, Switzerland, assignors to Ateliers des Charmilles S.A., Geneva, Switzerland

Filed Mar. 24, 1976, Ser. No. 670,053

Claims priority, application Switzerland, Apr. 11, 1975, 4634/75

Int. Cl.² B23P *1/08*

U.S. Cl. 219—69 C **6 Claims**



1. Process for monitoring the machining efficiency of an EDM machine placing across a machining zone between an electrode tool and an electrode workpiece successive electrical discharges obtained by connecting and disconnecting across said machining zone at least one source of direct current, said process comprising detecting which ones of said electrical discharges are machining discharges, establishing an electrical signal of an amplitude proportional to the total durations of said machining discharges relative to a predetermined machining time interval, multiplying the value of said electrical signal by a second value representative of the current level of said discharges for obtaining a third value representative of the useful machining current, and multiplying the value of said electrical magnitude by the theoretical material removal rate by unit of time and current for providing a fourth value having an amplitude representative of the real material removal rate.

3. An apparatus for monitoring the machining efficiency of an EDM machine providing at the machining gap between an electrode tool and an electrode workpiece successive electrical discharges obtained by consecutively connecting and disconnecting thereacross at least one source of direct current, said apparatus comprising means for detecting whether an electrical discharge is electro-erosive, said means comprising means for establishing a logic signal each time there occurs an electro-erosive discharge, means for establishing an electrical signal of a value proportional to the frequency of said logic signal and to the average duration of said electro-erosive discharges, means for measuring the machining current during the duration of an electrical discharge only when said logic signal occurs, means for providing said electrical signal with a value proportional to the average value of the measured current, means for giving to said logic signal a value established during the duration of a discharge and no value between two consecutive discharges, and means for providing said electrical signal with a value proportional to the average value of said logic signal.

4,090,962

REVERSE FLUSHING FILTER DEVICE

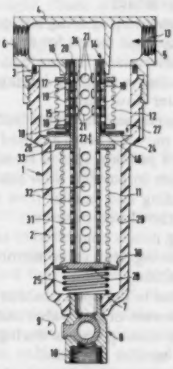
Bernhard W. Braukmann, Mosbach, Germany, assignor to Braukmann Armaturen A.G., Rothrist, Switzerland

Filed May 6, 1977, Ser. No. 794,349

Claims priority, application Germany, Oct. 12, 1976, 2645948

Int. Cl.² B01D *29/38*

U.S. Cl. 210—108 **13 Claims**



1. A reverse flushing filter device having a housing, an inlet and outlet to said housing, a first filter in said housing receiving the flow between said inlet and said outlet, movable means in said housing for diverting the flow through said first filter, a second filter upstream of said first filter in said housing, an apertured housing inside said second filter, a movable apertured tubular slide operable on said apertured housing to provide a closure to the interior of said second filter and during flow through said first filter, said tubular slide extending into said first filter, a discharge aperture to said housing, a movable shutoff element to said discharge aperture, said movable means and tubular slide being responsive to opening of said shutoff element whereby said movable means diverts flow through said first filter and said tubular slide aligns with said inside housing to permit flow through said second filter and into the tubular slide extension to reverse flush the particles on said first filter into said discharge aperture.

4,090,963

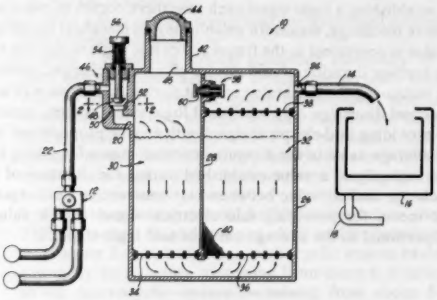
SOFTENING UNIT FOR APPLIANCE

Edward C. Grout, Sun Prairie, Wis., assignor to Sta-Rite Industries, Inc., Racine, Wis.

Continuation of Ser. No. 613,290, Sep. 15, 1975, abandoned. This application Dec. 27, 1976, Ser. No. 754,628

Int. Cl.[2] C02B *1/22*

U.S. Cl. 210—130 2 Claims



1. A water softening unit for use in a water supply conduit wherein water is intermittently supplied to an appliance at a predetermined flow rate, said unit comprising:

a housing including a regeneration chamber and an ion exchange chamber;

said housing including an opening for the admission of salt into said regeneration chamber;

conduit means communicating with said regeneration and ion exchange chambers and defining a water flow path through said chambers in series flow relation with the water supply conduit;

and the improvement comprising a selective flow restriction valve in said conduit means for selectively reducing flow from the predetermined flow rate to a smaller flow rate;

said valve including a housing having an inlet and outlet along said water flow path;

a valve seat between said inlet and outlet;

a valve member movable from a closed position against said seat to an open position spaced from said seat;

a restricted bypass in parallel flow relation with said valve seat for providing said smaller flow rate when said valve member is in the closed position;

a valve operating means connected to said valve member for selectively moving said valve member from the open to the closed position;

said valve member in the open position being located in said flow path upstream of said valve seat and subject to flow induced valve closing forces during said predetermined flow and said smaller flow; and

spring means biasing said valve member toward said open position with a force larger than the valve closing force induced by said predetermined flow and smaller than the valve closing force induced by said smaller flow.

4,090,964

ACID DISPENSER FOR WATER SOFTENER UNIT

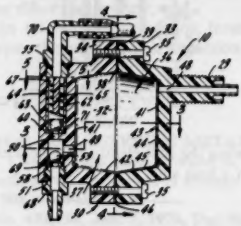
Daniel Allen Bakken, White Bear Lake; Robert Allen Henderson, Rosemount, and Edward Joseph Tischler, St. Paul, all of Minn., assignors to Ecodyne Corporation, Lincolnshire, Ill.

Filed Jul. 21, 1977, Ser. No. 817,633

Int. Cl.[2] B01D *41/00*

U.S. Cl. 210—134 7 Claims

1. A water softening system wherein water being treated flows through a bed of ion exchange particles in a tank during a service cycle and such particles are regenerated by flowing an acid solution and a brine solution through such tank during a regeneration cycle, the acid solution being supplied to such tank from an unpressurized acid storage reservoir of an acid dispensing unit through a regenerant supply line from a brine reservoir, said acid dispensing unit comprising a hollow housing having an acid metering chamber therein, said housing comprising a first member and a second member each having an identical conical cavity therein and an annular surface surrounding its cavity, a flexible diaphragm in said chamber shaped substantially identically like the surface of one of said cavities, and lying in contact with and lining one or the other of said cavities, an annular rim extending from said diaphragm, said rim being compressed between said annular surfaces which are held in abutment by means securing said members together, a first hole through said first member connecting its cavity to a source of pressure and suction, a second hole through said second member connecting its cavity to an acid flow channel, one end of said channel being connected to an intake line from said acid storage reservoir and the other end of said channel being connected to an acid dispensing line leading to a reservoir for said brine solution, a first check valve seat in



said channel on one side of said second hole and a loose spherical ball check valve on said first seat, a second check valve seat in said channel on the other side of said second hole and a spring holding a spherical ball check valve against said second seat, said metering chamber being empty when said diaphragm lines the cavity in said second member, suction applied to said first hole causing said diaphragm to flop to a mirror image position lining said first cavity, movement of said diaphragm from said second cavity to said first cavity creating suction in said chamber which draws sufficient acid through said one end of said channel past said first check valve to fill said chamber, and pressure applied to said first hole causing said diaphragm to flop to a position lining said second cavity, thereby expelling all of the acid in said chamber through said second hole and past said second check valve into said brine reservoir from which such metered quantity of acid passes with said brine solution through said regenerant supply line to said bed during said regeneration cycle.

4,090,965

INSTALLATION FOR THE MECHANICAL-BIOLOGICAL PURIFICATION OF WASTE WATER

Ernst Fuchs, Schmerikon, Switzerland, assignor to Mecafina SA, Schmerikon, Switzerland

Filed Dec. 26, 1972, Ser. No. 318,541

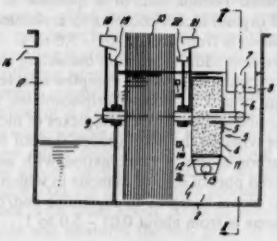
Claims priority, application Switzerland, Dec. 29, 1971, 19130/71

Int. Cl.[2] C02B *1/04;* B01D *33/06*

U.S. Cl. 210—151 26 Claims

1. An installation for the mechanical-biological purification of waste water, comprising means for the biological purification of said waste water and means for the mechanical purification of said waste water, said mechanical purification means including a drivable drum filter having a filter surface including an inflow side, cleaning means for cleaning the filter surface, said cleaning means for the drum filter comprising a suction device including a suction nozzle, said suction nozzle being immersed in the waste water and snugly bearing against

the inflow side of the filter surface of the drum filter, and a drive turbine provided for the drum filter, said suction device



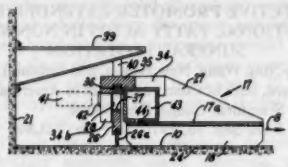
having a withdrawal line, the withdrawal line of the suction device supplying said drive turbine.

4,090,966

SEDIMENT COLLECTION AND REMOVAL SYSTEM FOR RECTANGULAR SEDIMENTATION BASIN

Frank B. Clendenen, 1545 Grass Valley Hwy., Apt. No. 41, Auburn, Calif. 95603

Filed Jun. 20, 1977, Ser. No. 807,825
Int. Cl.² B01D *21/18*
U.S. Cl. 210—143 **17 Claims**



1. A sediment collection and removal system for a liquid containing rectangular basin including a bottom, a pair of side walls, a first end and a second end, said system comprising:

a. a scraper body translatable along said bottom from said first end in a first sediment collecting and removal direction to said second end and from said second end in a second return direction to said first end;

b. a scraper blade vertically slidably mounted on said scraper body and movable between a lower scraping position in engagement with said bottom and an upper retracted position spaced above said bottom;

c. retent means carried on said scraper body for holding said scraper blade in said retracted position;

d. a riser ramp adjacent said second end engageable with said scraper blade to raise said scraper blade from said scraping position to said retracted position; and,

e. scraper blade lowering means adjacent said first end for moving said scraper blade from said retracted position to said scraping position.

4,090,967

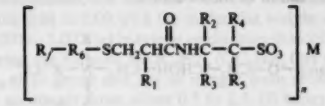
AQUEOUS WETTING AND FILM FORMING COMPOSITIONS

Robert A. Falk, New City, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Dec. 19, 1975, Ser. No. 642,272
Int. Cl.² A62C *1/00*
U.S. Cl. 252—3 **10 Claims**

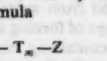
1. An aqueous film forming concentrate composition for extinguishing or preventing fires by suppressing the vaporization of flammable liquids, said composition comprising

A. 0.5 to 25% by weight of a fluorinated surfactant of the formula



where R_f is straight or branched chain perfluoroalkyl of 1 to 18 carbon atoms or perfluoroalkyl substituted by perfluoroalkoxy of 2 to 6 carbon atom; R_1 is hydrogen or lower alkyl; each of R_2, R_4, and R_5, is individually hydrogen or alkyl group of 1–12 carbons; R_3 is hydrogen, alkyl of 1 to 12 carbons, phenyl tolyl, and pyridyl; R_6 is branched or straight chain alkylene of 1 to 12 carbon atoms, alkylenethioalkylene of 2 to 12 carbon atoms, alkyleneoxyalkylene of 2 to 12 carbon atoms or alkyleneiminoalkylene of 2 to 12 carbon atoms where the nitrogen atom is secondary or tertiary; M is hydrogen, a monovalent alkali metal, an alkaline earth metal, an organic base or ammonium; and *n* is an integer corresponding to the valency of M;

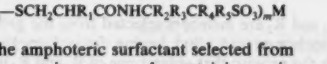
B. 0.1 to 5% by weight of a fluorinated synergist of the formula



where R_f is as defined above; R is R_6 or $—R_6SCH_2CHR_1—$, *m* is an integer 0 or 1, Z is one or more covalently bonded groups selected from — $CONR_1R_2$, —CN, — $CONR_1COR_2$, $SO_2NR_1R_2$, $—SO_2NR_1R_7(OH)_m$, $—R_7(OH)_m$, $—R_7(O_2CR_1)_m$, $—CO_2R_1$, $—C(=NH)NR_1R_2$ where R_1, R_2 and R_6 are as defined above and R_7 is a branched or straight chain alkylene of 1 to 12 carbon atoms, containing one or more polar groups;

C. 0.1 to 25% by weight of an ionic non-fluorochemical surfactant selected from

1. an anionic surfactant of the formula



2. the amphoteric surfactant selected from

a. organic compounds containing amino and carboxy groups, and

b. organic compounds containing amino and sulfo groups;

D. 0.1 to 40% by weight of nonionic nonfluorochemical surfactant, selected from polyoxyethylene derivatives of alkyl-phenols, linear or branched alcohols, fatty acids, mercaptans, alkylamines, alkylamides, acetylenic glycols, phosphorus compounds, glucosides, fats and oils, amine oxides, phosphine oxides those derived from block polymers containing polyoxyethylene or polyoxypropylene units,

E. 0 to 70% by weight of a solvent selected from an alcohol or an ether,

F. 0 to 5% by weight of an electrolyte which is a salt of an alkaline earth metal.

4,090,968

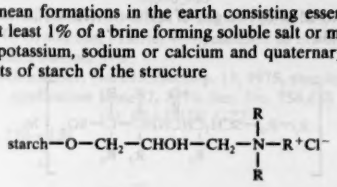
WATER LOSS REDUCTION AGENTS

Jack M. Jackson, and Arlynn H. Hartfiel, both of Houston, Tex., assignors to Chemical Additives Company, Houston, Tex.

Continuation-in-part of Ser. No. 595,852, Jul. 14, 1975, Pat. No. 3,993,570, which is a continuation-in-part of Ser. No. 355,166, Apr. 27, 1973, abandoned. This application Jun. 7, 1976, Ser. No. 693,370
Int. Cl.² C09K *7/02*
U.S. Cl. 252—8.5 A **6 Claims**

1. An aqueous clay-free non-thixotropic wellbore fluid having improved fluid loss control at high temperatures for use in

subterranean formations in the earth consisting essentially of water, at least 1% of a brine forming soluble salt or mixture of salts of potassium, sodium or calcium and quaternary ammonium salts of starch of the structure



where R is independently selected from alkyl radicals having 1 to 8 carbon atoms in an amount sufficient to provide water loss control.

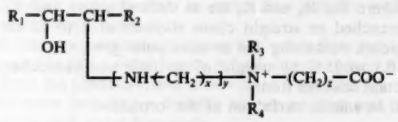
4,090,969

METHOD OF OIL RECOVERY BY FLOODING EMPLOYING BETAINE SOLUTIONS

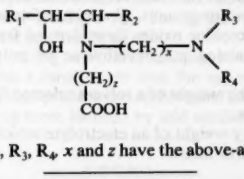
Karlheinz Koch, Haan, and Horst Rutzen, Langenfeld, both of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Dusseldorf-Holthausen, Germany

Filed Jan. 10, 1977, Ser. No. 758,039
Claims priority, application Germany, Jan. 10, 1976, 2600778
Int. Cl.[2] E21B *43/22*
U.S. Cl. 252—8.55 D **5 Claims**

1. A method of extracting mineral oil from subterranean formation by flooding comprising the steps of forcing an aqueous liquid into a subterranean formation containing mineral oil and displacing the mineral oil through at least one bore hole in the subterranean formation, said aqueous liquid containing from 0.01% to 15% by weight of an amphoteric surface-active compound selected from the group consisting of (1) a betaine having the formula



wherein R_1 and R_2 are members selected from the group consisting of hydrogen and alkyl having from 1 to 18 carbon atoms, with the proviso that at least one of R_1 and R_2 is hydrogen and the sum of the carbon atoms in $R_1 + R_2$ is from 9 to 18, R_3 and R_4 are members selected from the group consisting of lower alkyl and lower alkylol, x is an integer from 2 to 4, y is an integer from 0 to 1 and z is an integer from 1 to 4, and (2) mixtures of said betaine with up to 20% by weight of an acid having the formula



wherein R_1, R_2, R_3, R_4, x and z have the above-assigned values.

4,090,970

ANTIOXIDANT COMPOSITIONS

Milton Braid, Westmont, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 18, 1977, Ser. No. 788,213
Int. Cl.[2] C10M *1/54, 3/48, 5/28, 7/52*
U.S. Cl. 252—42.7 **44 Claims**

1. A composition comprising a major proportion of an organic medium normally susceptible to oxidation and a minor proportion sufficient to impart antioxidant properties thereto of a mixture soluble therein consisting essentially of an organosulfur containing nickel complex selected from the group consisting of nickel thiobis-alkylphenolates, nickel thiobis-alkylphenol-phenolates and amine complexes of nickel thiobis-alkylphenolates, wherein the alkyl groups thereof have from 1 to about 30 carbon atoms, in combination with an arylamine, and/or a hindered phenol, and/or a quinone in which the weight ratio of organo nickel complex to arylamine, hindered phenol, or quinone is from about 0.01 - 5.0 to 1.

25. An antioxidant additive mixture consisting essentially of an organosulfur containing nickel complex selected from the group consisting of nickel thiobis-alkylphenolates, nickel thiobis-alkylphenol-phenolates, amine complexes of nickel thiobis-alkylphenolates wherein the alkyl groups thereof have from 1 to about 30 carbon atoms in combination with an arylamine and/or a hindered phenol and/or quinone in which the weight ratio of organo nickel complex to arylamine and/or hindered phenol or quinone is from about 0.01 - 5.0 to 1.

4,090,971

SUBSTITUTED SALICYLAMIDES AND LUBRICANTS CONTAINING THE SAME

Donald Irvin Hoke, Chagrin Falls, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Filed Jun. 16, 1975, Ser. No. 587,512
Int. Cl.[2] C10M *1/32*
U.S. Cl. 252—51.5 A **19 Claims**

1. A composition comprising amides of substituted salicyclic acids in which at least one substituent in said acid is a hydrocarbon-based radical containing at least about 10 carbon atoms.

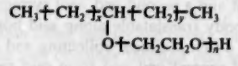
4,090,972

EFFECTIVE PROMOTER EXTENDER FOR CONVENTIONAL FATTY ACIDS IN NON-SULFIDE MINERAL FLOTATION

Samuel Shan-Ning Wang, New Haven, and Eugene Leroy Smith, Jr., Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Connecticut 06904

Filed Sep. 16, 1976, Ser. No. 723,842
Int. Cl.[2] B03D *1/00*
U.S. Cl. 252—61 **5 Claims**

1. A collector combination for non-sulfide ores comprising a fatty acid derived from a vegetable or animal oil and a linear secondary alcohol of the formula:



wherein x and y are individually zero or integers such that the sum of x and y provides an alcohol having a total of about 8 to 20 carbon atoms exclusive of an ethoxylate content and n is an integer of 0 to 10, the weight ratio of said fatty acid to said alcohol being from about 99:1 to 3:1.

4,090,973

METHOD FOR MAKING STABLE DETERGENT COMPOSITIONS

Edward John Maguire, Jr., and Eugene J. Pancheri, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jun. 24, 1976, Ser. No. 699,417
Int. Cl.[2] C11D *7/42*
U.S. Cl. 252—89 R **13 Claims**

1. A method for preparing a liquid detergent composition containing a normally incompatible enzyme component, said composition consisting essentially of an effective amount of an enzyme component selected from the group consisting of proteolytic enzymes, amylolytic enzymes and mixtures thereof, from about 0.5% to about 30% by weight of water, up to about 10% by weight of said composition being present as free water, the remainder of the water being present as water of hydration, from about 0.5% to about 30% by weight of a surface active agent selected from the group consisting of

anionic, nonionic ampholytic and zwitterionic surface active agents and mixtures thereof, and from about 40% to about 98% by weight of components selected from the group consisting of organic and inorganic builder materials, alkali materials, sequestering agents, china protecting agents, reducing agents, hydrotropes, corrosion inhibitors, soil suspending ingredients, drainage promoting ingredients, suds regulating agents, tarnish inhibitors, buffering agents, perfumes, dyes, inert carriers, and mixtures thereof, comprising encapsulating said incompatible enzyme component in a material, at least about 30% by weight of which is a watersoluble normally solid alkoxylated nonionic surface active agent selected from the group consisting of polyethylene glycol having a molecular weight from about 3000 to about 40,000, the condensation product of one mole of tallow alcohol with from about 20 to to about 80 moles of ethylene oxide and mixtures thereof, prior to the addtion of said incompatible enzyme component to the detergent composition.

7. A liquid detergent composition consisting essentially of:

(a) from about 0.5% to about 30% by weight of a surface active agent selected from the group consisting of anionic, nonionic, ampholytic and zwitterionic surface active agents;

(b) from about 0.5% to about 30% of water, up to about 10% of said composition being present as free water, the remainder of the water being present as water of hydration; and

(c) an effective amount of a normally incompatible enzyme component selected from the group consisting of proteolytic and amylolytic enzymes and mixtures thereof, encapsulated in a material at least 30% by weight of which is a water-soluble normally solid alkoxylated nonionic surface active agent selected from the group consisting of polyethylene glycol having a molecular weight from about 3000 to to about 40,000, the condensation product of one mole of tallow alcohol with from about 20 to about 80 moles of ethylene oxide and mixtures thereof, and

(d) from about 40% to about 98% by weight of components selected from the group consisting of organic and inorganic builder materials, alkali materials, sequestering agents, china protecting agents, reducing agents, hydrotropes, corrosion inhibitors, soil suspending ingredients, drainage promoting ingredients, suds regulating agents, tarnish inhibitors, buffering agents, perfumes, dyes, inert carriers, and mixtures thereof.

4,090,974
CARPET CLEANING COMPOSITION

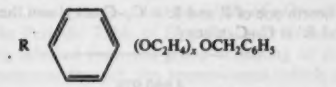
Stephen A. Morganson, Inver Grove Heights, Minn., assignor to FMC Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 468,769, May 10, 1974, abandoned. This application Jun. 8, 1976, Ser. No. 693,993

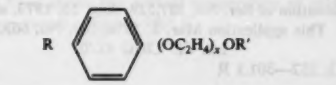
Int. Cl.[2] **C11D** *3/06, 7/16, 11/00*

U.S. Cl. 252—135 **5 Claims**

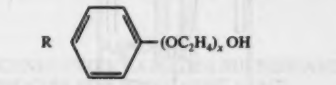
1. A carpet cleaning concentrate consisting essentially of by weight: (a) sodium tripolyphosphate, 75 to 95%; (b) sodium metasilicate pentahydrate, 3 to 10%; (c) a low-foaming nonionic surfactant, 0.5 to 10%, said nonionic surfactant being selected from the group consisting of (a) condensation products of one mole of a C_8–C_{22} normal fatty alcohol with from 3-20 moles of ethylene oxide, (b) polyoxypropylene-polyoxyethylene condensates having the formula HO $(C_2H_4O)_x$ $(C_3H_6O)_y$ $(C_2H_4O)_x$ H where y equals at least 15 and $(C_2H_4O)_{x+z}$ equals 20-90% of the total weight of the condensate, (c) alkyl polyoxypropylene-polyoxyethylene condensates having the formula RO-$(C_3H_6O)_x$ $(C_2H_4O)_y$ H where R is a C_1–C_{15} alkyl group and x and y represent an integer from 2 to 98, (d) polyoxyalkylene glycol compounds having a plurality of alternating hydrophobic and hydrophilic polyoxyalkylene chains, the hydrophilic chains consisting of linked oxyethylene radicals and the hydrophobic chains consisting of linked oxypropylene radicals, said compounds having three hydrophobic chains, linked by two hydrophilic chains, the central hydrophobic chain constituting 30 to 34% by weight of said compounds in which the terminal hydrophobic chains together constitute 31-39% by weight of said compounds, the linking hydrophilic chains together constituting 31 to 35% by weight of said compounds, the intrinsic viscosity of said compounds being from 0.06 to 0.09 with the molecular weight being from about 3,000 to 5,000, (e) butylene oxide capped alcohol ethoxylates having the formula $R(OC_2H_4)_y(OC_4H_9)_x$ OH where R is a C_8–C_{18} alkyl group and y is an integer from about 3.5 to 10 and x is an integer from about 0.5 to 1.5, (f) benzyl ethers of polyoxyethylene condensates of alkyl phenols having the formula



where R is a C_6–C_{20} alkyl group and x is an integer from 5 to 40, (g) alkyl ethers of polyoxyethylene condensates of alkyl phenols having the formula



where R is a C_6–C_{12} alkyl group, R′ is a C_4–C_{-12} alkyl group and x is an integer from 5 to 40, and (h) alkyl phenoxy polyoxyethylene ethanols having the formula



where R is a C_8–C_{20} alkyl group and x is an integer from 3 to 20; (d) water, 0 to 5%.

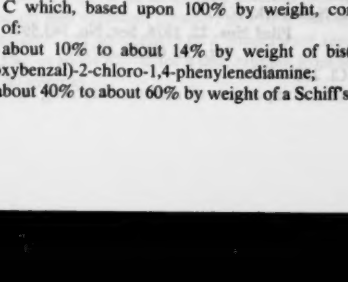
4,090,975
MIXTURES OF NEMATIC LIQUID CRYSTAL MATERIALS

Ralph E. Aldrich, Acton; William J. Cumming, N. Chelmsford, both of Mass., and William A. Simmons, Jr., Houston, Tex., assignors to Itek Corporation, Lexington, Mass.

Continuation-in-part of Ser. No. 519,970, Nov. 1, 1974, abandoned, and Ser. No. 519,971, Nov. 1, 1974, abandoned. This application Jun. 28, 1976, Ser. No. 700,354

Int. Cl.[2] **C09K** *3/34;* **G02F** *1/13*

U.S. Cl. 252—299 **1 Claim**



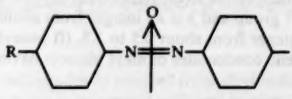
1. A liquid crystal composition having a freezing point of at most about −50° C and an isotropic transition point of at least about 80° C which, based upon 100% by weight, consists essentially of:

a. from about 10% to about 14% by weight of bis(4′-n-octyloxybenzal)-2-chloro-1,4-phenylenediamine;

b. from about 40% to about 60% by weight of a Schiff's base

nematic liquid crystal compound selected from the group consisting of p-ethoxybenzylidene-p'-n-butylaniline and p-butoxybenzylidene-p'-n-butylaniline; and,

c. from about 35 to about 50% by weight of a mixture of nematic liquid crystal azoxy compounds represented by the structural formula



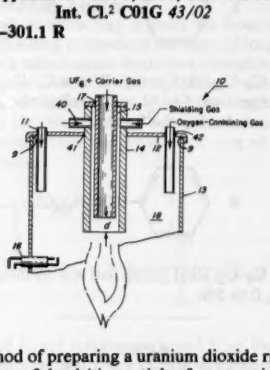
wherein one of R and R' is C_1–C_8 alkyl and the other of R and R' is C_1–C_8 alkoxy.

4,090,976

PROCESS FOR PRODUCING URANIUM OXIDE RICH COMPOSITIONS FROM URANIUM HEXAFLUORIDE

William R. DeHollander, San Jose, Calif., and Charles P. Fenimore, Schenectady, N.Y., assignors to General Electric Company, San Jose, Calif.

Continuation of Ser. No. 387,529, Aug. 10, 1973, abandoned.
This application Mar. 3, 1976, Ser. No. 663,274
Int. Cl.[2] C01G *43/02*
U.S. Cl. 252—301.1 R 40 Claims



1. The method of preparing a uranium dioxide rich composition in the form of dendritic particles from uranium hexafluoride in a reaction zone in the presence of an active flame comprising the steps of:

(a) introducing a first gaseous reactant comprising a mixture of uranium hexafluoride and a reducing carrier gas into the reaction zone, said reactant being maintained at a temperature of less than about 550° C prior to introduction into the reaction zone in order to avoid any reaction between the uranium hexafluoride and the reducing gas prior to the introduction of said reactant to the reaction zone,

(b) separately introducing a second gaseous reactant comprising an oxygen-containing gas into the reaction zone, and

(c) separately introducing a shielding gas into the reaction zone between said first gaseous reactant and said second gaseous reactant which temporarily prevents substantial mixing and reaction between said first gaseous reactant and said second gaseous reactant to produce a uranium dioxide rich composition until sufficient cross diffusion of said reactants and the shielding gas occurs as said reactants and the shielding gas pass through the reaction zone.

4,090,977

OSMOTICALLY BALANCED ANTICOAGLANT

Stephen Dubin, Springfield, Pa., assignor to Research Corporation, New York, N.Y.

Filed Nov. 22, 1976, Ser. No. 743,597
Int. Cl.[2] G01N *33/16*
U.S. Cl. 252—408 12 Claims

1. In a composition of matter comprising in vitro whole mammalian blood in admixture with an effective amount of an anticoagulant, the improvement wherein the anticoagulant is an osmotically balanced composition consisting essentially of (a) H_4 EDTA in free acid form and (b) at least one salt which lowers hematocrit values as determined by centrifugation, the ratio of (*a*) : (*b*) being such that said hematocrit values of the blood are substantially identical to those of fresh or heparinized blood and substantially independent of the concentration of said composition.

4,090,978

ELECTROCATALYSTS AND A METHOD FOR THE PREPARATION THEREOF

Lawrence B. Welsh, Evanston, and Richard W. Leyerle, Mt. Prospect, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Dec. 28, 1976, Ser. No. 755,113
Int. Cl.[2] B01J *21/18, 23/40;* H01M *4/96*
U.S. Cl. 252—425.3 12 Claims

1. An electrocatalyst which may be used in the preparation of an electrode for an electrochemical cell prepared by the steps which comprises:

(a) treating a refractory inorganic oxide having a surface area from 1 to 500 square meters per gram with an organic pyrolyzable compound in a reducing atmosphere at a temperature of from about 400° to about 1200° C to pyrolyze said organic compound to form a carbonaceous pyropolymer having a conductivity at room temperature of from about 10^{-8} to 10^{2} inverse ohm-centimeters on the surface of said refractory inorganic oxide;

(b) leaching said carbonaceous pyropolymer depositedrefractory inorganic oxide with an acid or base to remove said refractory inorganic oxide;

(c) impregnating the remaining carbonaceous pyropolymer with a soluble salt of at least one catalytically active metal; and

(d) recovering said electrocatalyst.

3. The catalytic composition of matter of claim 1 in which said catalytically active metal is platinum.

9. The catalytic composition of matter prepared by the steps of claim 1 in which said refractory inorganic oxide is silica.

10. The catalytic composition of matter prepared by the steps of claim 1 in which said leaching is effected at a temperature in the range of from about ambient to about 250° C.

11. The catalytic composition of matter prepared by the steps of claim 1 in which said refractory inorganic oxide is leached by treatment with phosphoric acid.

4,090,979

PROCESS FOR PRODUCING CHEMICAL PUMP ABSORBENTS FOR A CARTRIDGE COMBUSTION-DRIVEN CHEMICAL LASER

John R. Ogren, McLean; Gilbert J. Ogle, Vienna, both of Va., and Eugene V. Rutkowski, Rancho Palos Verdes, Calif., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 6, 1977, Ser. No. 794,690
Int. Cl.[2] B01J *23/02, 23/04, 27/10*
U.S. Cl. 252—441 8 Claims

1. A process for producing improved chemical absorbent materials, comprising precipitating metal that is dissolvable in anhydrous ammonia at liquid nitrogen temperature from a solution of the metal and anhydrous ammonia that is cooled to low temperature to form a precipitated metal of high surface area when the anhydrous ammonia is distilled off.

4,090,980

METHOD FOR PREPARING REDUCED METAL CATALYST HAVING METAL SURFACE AREA

James L. Carter, and Allan E. Barnett, both of Westfield, N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Continuation-in-part of Ser. No. 633,809, Nov. 20, 1975, abandoned. This application May 6, 1977, Ser. No. 794,370

Int. Cl.[2] B01J *29/00, 29/10*

U.S. Cl. 252—454 12 Claims

1. A process of stabilizing, with respect to atmospheric air, a bed containing pyrophoric reduced metal catalyst with high active metal surface area formed by reduction of a compound of said metal at an elevated temperature ranging from 200° C. to 500° C. which comprises;

(a) continuously circulating through said bed a stream of an inert gas while maintaining a catalyst temperature of at least 300° F. (149° C.);

(b) cooling the catalyst throughout the bed with said inert gas until the catalyst in said bed attains a temperature ranging from about 50° to about 100° F.;

(c) decreasing the inert gas flow and progressively adding CO_2 until the CO_2 concentration in the gas stream is at least about 80%;

(d) adding O_2 to the gas stream to obtain about 0.05 vol. % O_2 in the gas stream and continuing this flow until a sufficient amount of O_2 has passed through the catalyst bed to attain about 25% of a monolayer coverage of oxygen on the active metal surface;

(e) increasing the O_2 concentration in the gas stream at a rate that will have passed enough O_2 through the catalyst bed to form about a monolayer on the active metal surface by the time the concentration reaches about 1 vol. % O_2; and

(f) increasing the O_2 concentration and decreasing the CO_2 concentration until said catalyst in the bed is stabilized with respect to atmospheric air, said stabilization treatments being characterized as providing a stabilized catalyst without loss of the initial metal surface area.

6. The process of claim 1 wherein the catalyst is a nickel silica catalyst.

7. The process of claim 6 wherein the nickel silica catalyst has been promoted with copper.

4,090,981

CATALYST FOR SELECTIVE PRODUCTION OF PARA DIALKYL SUBSTITUTED BENZENES

Paul G. Rodewald, Rocky Hill, N.J., assignor to Mobile Oil Corporation, New York, N.Y.

Filed Sep. 23, 1976, Ser. No. 726,091

Int. Cl.[2] B01J *29/06*

U.S. Cl. 252—455 Z 11 Claims

1. A catalyst composition comprising a porous crystalline aluminosilicate zeolite having deposited thereon a coating of silica which extensively covers and resides substantially exclusively on the external surface thereof as a result of contact with a silicone compound of a molecular size incapable of entering the pores of the zeolite and subsequent heating in an oxygen-containing atmosphere to a temperature in excess of 300° C. but below a temperature at which crystallinity of the zeolite is adversely affected at a rate such that the silicone compound does not volatilize prior to undergoing oxidation to silica, said zeolite being characterized by an activity, in terms of alpha value, of between about 2 and about 5000, a xylene sorption capacity greater than 1 gram/100 grams of zeolite and an ortho xylene sorption time for 30 percent of said capacity greater than 10 minutes, said sorption capacity and sorption time being measured at 120° C. and a pressure of 4.5 ± 0.8 mm. of mercury.

4,090,982

HYDRODESULFURIZATION CATALYST

William R. Moser, Wayland, Mass., assignor to Exxon Research & Engineering Co., Linden, N.J.

Division of Ser. No. 639,867, Dec. 11, 1975, Pat. No. 4,018,672. This application Sep. 27, 1976, Ser. No. 727,271

Int. Cl.[2] B01J *21/04, 23/84, 23/88*

U.S. Cl. 252—465 9 Claims

1. In a catalyst comprising an alumina support composited with a hydrogenation component, said hydrogenation component being selected from the group consisting of at least one elemental metal, metal oxide and metal sulfide of a Group VIB element of the Periodic Table of Elements and at least one elemental metal, metal oxide and metal sulfide of a Group VIII element of the Periodic Table of Elements, said Group VIII element being selected from the group consisting of nickel, cobalt and mixtures thereof, the improvement which comprises said alumina having been prepared by hydrolyzing an aluminum alcoholate to aluminum hydroxide and thermally decomposing said aluminum hydroxide in a solvent selected from the group consisting of C_1 to C_4 alcohols, acetone, methylethylketone, cyclic ethers and terahydrofuran, at a temperature ranging from above the critical temperature of said solvent to a temperature of about 980° C.

4,090,983

PHOTOCONDUCTIVE CADMIUM SULFIDE AND PROCESS FOR PRODUCING SAME

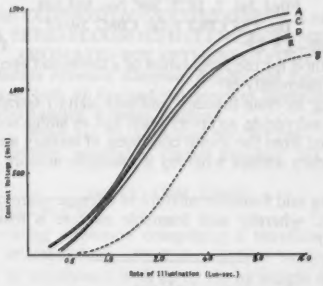
Teruhisa Akaoka, Yokohama, Japan, assignor to KIP Corporation, Tokyo, Japan

Filed Oct. 28, 1976, Ser. No. 736,502

Claims priority, application Japan, Nov. 6, 1975, 50-133405

Int. Cl.[2] H01C *31/00*

U.S. Cl. 252—501 10 Claims



1. A process for the production of photoconductive cadmium sulfide which comprises subjecting cadmium sulfide powder to a heat treatment conducted at a temperature ranging from about 200° to about 600° C for at least about 5 minutes in an oxygen-containing inert gas atmosphere, incorporating the treated cadmium sulfide powder with a metal halide flux, an activator selected from the group consisting of sliver salts and copper salts and sulfur in an amount of 0.002–0.05% by weight based on said cadmium powder, and then baking the mixture in an inert gas atmosphere at a temperature ranging from about 550° to about 800° C for a time ranging from about 20 to about 60 minutes.

4,090,984

SEMI-CONDUCTIVE COATING FOR GLASS FIBERS

Kingso C. Lin, and Donald J. Hammond, both of Newark, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Feb. 28, 1977, Ser. No. 772,605
Int. Cl.[2] H01B 1/06
U.S. Cl. 252—511 9 Claims

1. An aqueous coating composition comprising at least one polyacrylate emulsion, a conductive carbon black dispersion and a thixotropic gelling agent said polyacrylate emulsion comprising a copolymer of an alkylacrylate and acrylonitrile.

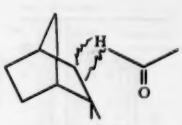
4,090,985

1-(3,3-DIMETHYL-2-NORBORNYL)-2-PROPANONE PERFUME COMPOSITIONS

William L. Schreiber, Jackson; James N. Siano, Keyport; Manfred Hugo Vock, Locust, all of N.J., and Edward J. Shuster, Brooklyn, N.Y., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 747,308, Dec. 3, 1976, Pat. No. 4,053,657. This application Jul. 28, 1977, Ser. No. 819,951
Int. Cl.[2] C11B 9/00
U.S. Cl. 252—522 4 Claims

1. A process for augmenting or enhancing the organoleptic properties of a perfume composition comprising the step of adding thereto a composition of matter having the structure:



wherein the wavy lines are representative or "exo" or "endo" configurations.

4,090,986

THERMOSET EPOXY FOAM COMPOSITIONS AND A METHOD OF PREPARING THE SAME

William T. Gormley, Pittsburgh, Pa., and Gerald J. Gillespie, Westfield, N.J., assignors to Koppers Company, Inc., Pittsburgh, Pa.

Filed Jul. 7, 1975, Ser. No. 593,838
Int. Cl.[2] C08J 9/08; C08G 59/42
U.S. Cl. 260—2.5 EP 17 Claims

1. A method for the preparation of a thermoset epoxy foam, consisting essentially of:

a. mixing in resin-foaming amounts delta-1-tetrahydrophthalic anhydride, an epoxy resin, and an amine accelerator selected from the group consisting of tertiary amines and secondary amines whereby a foamable mixture is made, and

b. heating said foamable mixture to a temperature of at least 115° C whereby said foamable mixture is foamed and cured.

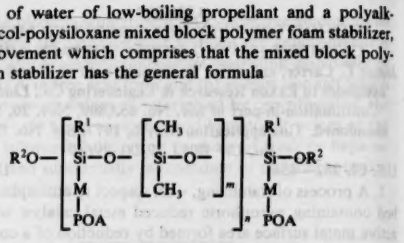
4,090,987

PROCESS OF PREPARING POLYETHERURETHANE FOAMS

Götz Koerner, Essen, and Gerd Rossmy, Haltern-Lavesum, both of Germany, assignors to Th. Goldschmidt AG, Essen, Germany

Continuation-in-part of Ser. No. 515,260, Oct. 16, 1974, abandoned, which is a continuation of Ser. No. 333,155, Feb. 16, 1973, abandoned. This application Jun. 4, 1975, Ser. No. 583,560
Claims priority, application Germany, Feb. 22, 1972, 2208149
Int. Cl.[2] C08K 5/54; C08G 18/14
U.S. Cl. 260—2.5 AH 8 Claims

1. In a process wherein a polyetherurethane foam is prepared by foaming polyether polyols and polyiosocyanate in the presence of water of low-boiling propellant and a polyalkyleneglycol-polysiloxane mixed block polymer foam stabilizer, the improvement which comprises that the mixed block polymer foam stabilizer has the general formula



wherein the mixed block polymer comprises dimethylpolysiloxane units wherein m has a value between 4 and 7, provided the number of units wherein $m = 5$ or 6 is at least twice the number of units wherein $m = 4$ and 7;

$n \geq 2$,

R^1 is saturated alkyl of 1 - 8 carbon atoms,

R^2 is saturated alkyl of 1 - 8 carbon atoms, the group POA or R_3^1Si—,

M is a divalent group which links the adjacent silicone atoms to POA,

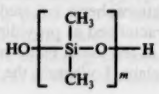
POA corresponds to the formula $(C_2H_4O)_r R^3$ and is composed of polyoxyethylene and polyoxypropylene units in the weight ratio of from 50 : 50 to 30 : 70,

r is an integer whose specific value or range is a corollary function of the specific value of said weight ratio and

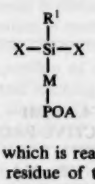
R^3 is saturated alkyl of 1 - 8 carbon atoms or phenyl, and

s is an integer whose specific value or range is a corollary function of the POA block mole weight,

POA has a block mole weight of from 1400 - 3000, said stabilizer prepared by adding a polydimethylsiloxanediol having the formula



with a tertiary amine to a compound having the formula



wherein X is a group which is reactive towards SiOH and then removing any residue of the X groups by adding compounds having the formula R^2OH to the reaction mixture.

4,090,988

POLYURETHANE FOAM PREPARATION USING PYRIDINE ETHER CATALYSTS

John S. Babiec, Jr., Orange; Steven T. Nakos, Wallingford, and Stephen L. Goldstein, Cheshire, all of Conn., assignors to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 648,451, Jan. 12, 1976, Pat. No. 4,048,107. This application Jul. 8, 1977, Ser. No. 813,904
Int. Cl.[2] C08G 18/20
U.S. Cl. 260—2.5 AC 14 Claims

1. A process for preparing a polyurethane foam from a reaction mixture which comprises an organic polyisocyanate, a polyol, a foaming agent and a catalytic proportion of an amino ether having the formula:

$$Z(OR'NR_2)_2$$

wherein

Z is unsubstituted pyridine or a substituted pyridine, the substituents being selected from the group consisting of alkyl having 1–12 carbon atoms, aryl having 6–12 carbon atoms and mixtures thereof,

R is methyl, ethyl, or the radical NR_2 is morpholino, and

R′ is an alkylene radical of 2 to 4 carbon atoms.

4,090,989
PROCESS FOR IMPROVING OZONE AND FLEX RESISTANCE OF CERTAIN ELASTOMERS

Mark Chaoming Chen, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 21, 1976, Ser. No. 698,018

The portion of the term of this patent subsequent to Mar. 7, 1995, has been disclaimed.

Int. Cl.[2] C08K *5/52;* **C08L** *7/00, 47/00*

U.S. Cl. 260—5 **19 Claims**

11. An unvulcanized composition of a polymer or polymer blend selected from:

A. chloroprene polymers containing about 90–100 weight percent chloroprene and 0–10 weight percent of a copolymerizable organic monomer,

B. chloroprene/sulfur copolymers in which the organic monomer composition is about 90–100 weight percent chloroprene and 0–10 weight percent of a copolymerizable monomer,

C. chlorinated isobutylene/isoprene copolymers, and

D. blends of any of the above polymers A-C with styrene/-butadiene copolymers or with natural rubber, the proportion of the polymer A, B, or C being at least 50 weight percent of the blend;

said composition comprising about 0.5–5 parts per 100 parts by weight of polymer or polymer blend of at least one of the following esters:

(1) bis(5-norbornene-2-methyl) phosphite,

(2) tris(5-norbornene-2-methyl) phosphite, and

(3) tris(5-norbornene-2-methyl) phosphate.

12. A vulcanized product obtained by the vulcanization of a composition of claim **11**.

4,090,990
PROCESS FOR PREPARING POLYFORMALS IN THE PRESENCE OF AN ORGANIC EPOXIDE

Ajaib Singh, and Samuel Kaizerman, both of Somerville, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation of Ser. No. 561,588, Mar. 24, 1975, abandoned, which is a division of Ser. No. 486,141, Jul. 5, 1974, abandoned, which is a continuation of Ser. No. 351,680, Apr. 16, 1973, abandoned. This application Dec. 20, 1976, Ser. No. 752,386

Int. Cl.[2] C08G *4/00*

U.S. Cl. 260—18 PF **5 Claims**

1. In a process for preparing a polyformal which comprises condensing an aliphatic diol, in which the hydroxyl groups are separated by at least four carbon atoms, with an essentially stoichiometric amount of formaldehyde in the presence of a Bronsted acid catalyst, the improvement which comprises contacting the condensation product thus formed with an organic epoxide in an amount sufficient to react with the residue of said acid catalyst, whereby said acid residue is removed from said polyformal.

4,090,991
PROCESS FOR PREPARATION OF OIL-IN-WATER EMULSIONS OF VINYL POLYMERS

Hiroshi Fukusaki; Masao Niki, and Yukinaga Yokota, all of Wakayama, Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Feb. 3, 1977, Ser. No. 765,074

Claims priority, application Japan, Mar. 5, 1976, 51-23977

Int. Cl.[2] C09D *3/66, 3/76, 3/81*

U.S. Cl. 260—23 EM **9 Claims**

1. A process for the preparation of oil-in-water emulsions of vinyl polymers, comprising: emulsion-polymerizing an emulsion-polymerizable vinyl monomer in the presence of from one to 50 weight percent, based on the total weight of the solids in the final reaction product, of a surface active polyester having a number average molecular weight of from 1000 to 5000, said surface active polyester having been formed by reacting and condensing a mixed polyol component with a polyester-forming dicarboxylic acid component, said mixed polyol component consisting essentially of (A) a polyester-forming polyol selected from the group consisting of 4,4′-bis(β-hydroxyethoxyphenyl)-2,2-propane, 4,4′-bis(β-hydroxypropoxyphenyl)-2,2-propane, diglycidyl ether of bisphenol A, di-β-methylglycidyl ether of bisphenol A and 2,2-bis-(4-cyclohexanol)-propane, and 10 to 50 parts by weight, per 100 parts by weight of (A), of (B) polyethylene glycol having the formula:

$$HO-(CH_2CH_2O)_nH$$

wherein n is an integer of from 3 to 100.

4,090,992
DISPERSIONS OF WATER SOLUBLE POLYMERS IN OIL

Clyde S. Scanley, Morristown, N.J., assignor to Drew Chemical Corp., Boonton, N.J.

Division of Ser. No. 613,231, Sep. 15, 1975, Pat. No. 4,052,353, which is a continuation-in-part of Ser. No. 429,548, Jan. 2, 1974, abandoned. This application Aug. 18, 1977, Ser. No. 825,728

Int. Cl.[2] C08F *2/32*

U.S. Cl. 260—29.6 AT **12 Claims**

1. An improved process for chemically modifying a water soluble polymer selected from the group consisting of acrylamide polymers and methacrylamide polymers, comprising:

chemically modifying said polymer dispersed in oil, without coagulation or agglomeration of said polymer, said dispersion having a water content at which the polymer remains finely divided and dispersed in the oil, said water content being less than 40%, by weight, based on said polymer and water, said polymer dispersed in oil having been prepared from a water in oil emulsion of said polymer by reduction of the water content thereof.

4,090,993
COATING COMPOSITIONS CONTAINING A MIXTURE OF A TETRAFLUOROETHYLENE POLYMER AN AROMATIC POLYETHERSULFONE

Terence Edwin Attwood, Kimpton, and Ronald Peter Buckley, Stevenage, both of England, assignors to Imperial Chemical Industries Limited, London, England

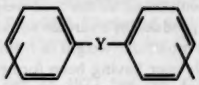
Filed Jul. 22, 1976, Ser. No. 707,766

Claims priority, application United Kingdom, Jul. 29, 1975, 31709/75

Int. Cl.[2] C08L *27/18*

U.S. Cl. 260—29.6 NR **11 Claims**

1. A coating dispersion comprising a tetrafluoroethylene polymer selected from tetrafluoroethylene homopolymers, telomers, or copolymers with up to 5% by weight of a comonomer, such as ethylene, vinyl chloride, hexafluoropropene or perfluoropropyl perfluorovinyl ether said tetrafluoroethylene polymer having an average particle size of less than 20 μm, dispersed in an inert diluent, said diluent having a thermoplastic aromatic polyethersulphone of reduced viscosity below 0.25 (as measured at 25° C on a solution of the polymer in dimethyl formamide containing 1 g of polymer in 100 cm^3 of solution) dissolved or dispersed as particles of size below 25 μm (as measured by a Micromerograph) therein, or the precursor to such a polyethersulphone, said thermoplastic aromatic polyethersulphone having repeat units of the general formula —Ar—SO_2— in which Ar is a divalent aromatic radical, at least some of the —Ar— units having the structure



in which Y is oxygen or the divalent radical obtained by removal of the hydrogen atoms from the —OH groups of an aromatic diol and in which 0 to 50% of the $—SO_2—$ groups are replaced by —CO— groups, said dispersion having a tetrafluoroethylene polymer/polyethersulphone (or precursor thereto) weight ratio between 4:1 and 1:3.

4,090,994

PROCESS FOR PREPARING A POLYVINYLCHLORIDE COMPOSITION BY POLYMERIZATION IN THE PRESENCE OF MOLDING ADDITIVES

Mineo Nagano; Michio Saitoh; Shigeru Awazawa, and Koji Tanaka, all of Yokkaichi, Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Japan

Filed Jan. 8, 1976, Ser. No. 647,563
Claims priority, application Japan, Jan. 11, 1975, 50-5298
Int. Cl.[2] C08F 2/44
U.S. Cl. 260—31.8 R **5 Claims**

1. A process for preparing a moldable colored stabilized polyvinylchloride composition which is moldable without the later addition of additives required to formulate a molding product after polymerizing vinyl chloride or vinyl chloride and a comonomer which comprises the step of (a) polymerizing vinyl chloride or a mixture of vinyl chloride and a comonomer in the gaseous phase under a polymerization pressure which is less than the saturated vapor pressure of vinyl chloride at the polymerization temperature in the presence of a powdered vinyl chloride polymer of average particle size 10–500μm as a solid substrate and including the step of (b) charging stabilizer and coloring agent to the polymerization system, the vinyl chloride polymerization being carried out in the presence of additives to form a moldable composition, which additives are all the additives required in the molded product formed from the moldable composition to function as stabilizer, lubricants, chelating agents, antioxidants, coloring agents, filler, reinforcing materials and plasticizers in the said molded product, all of said additives when required in the molded product being charged to the polymerization system before or during polymerization, and including said stabilizer and coloring agent of step (b), with the proviso that the additives functioning as stabilizers, lubricants, chelating agents or antioxidants are inorganic metal compounds, organic metallic compounds or organic compounds or mixtures thereof, inorganic metal compound additives, when present, being present in the amount of 0.01 to 4 wt. parts and organic metallic compounds and organic compound additives, when present, being present in 0.05 to 6 wt. parts for every 100 parts of polymer formed, and with the further proviso that all the additives and the solid substrate are fluidized in a powdery form in a fluidized bed and vinyl chloride monomer is recycled through the fluidized bed.

4. A process for preparing a moldable composition of polyvinyl chloride grafted upon an ethylene-vinyl acetate copolymer which comprises the steps of (a) introducing liquid vinyl chloride containing the dissolved ethylene-vinyl acetate copolymer under conditions in which the vinyl chloride is vaporized into a reactor containing powdered polyvinyl chloride grafted onto ethylene-vinyl acetate copolymer and at a polymerization pressure lower than the saturated vapor pressure of vinyl chloride at the polymerization temperature, (b) charging stabilizer to the polymerization system, polymerizing the vinyl chloride in the presence of additives to form a moldable product which additives are all the additives required in the molded product from the moldable composition, said moldable composition including, as additives, stabilizers and other required additives, to function as stabilizers, lubricants, chelating agents, coloring agents, filler, reinforcing materials and plasticizers in the said molded product, all of said additives when required in the molded product being charged into the reactor before or during polymerization and including said stabilizer of step (b), with the proviso that the additives functioning as stabilizers, lubricants, chelating agents or antioxidants are inorganic metal compounds, organic metallic compounds or organic compounds or mixtures thereof, inorganic metal compound additives when present, being present in the amount of 0.01 to 4 wt. parts and organic metallic compounds and organic compound additives, when present, being present in 0.05 to 6 wt. parts for every 100 parts of polymer formed.

4,090,995

PROCESS FOR HOT RESIN COATING OF SHELL SANDS USING SALICYLIC ACID

John G. Smillie, Aurora, Ill., assignor to Aurora Metal Corporation, Aurora, Ill.

Filed Jan. 17, 1977, Ser. No. 759,878
Int. Cl.[2] C08L 61/06
U.S. Cl. 260—38 **10 Claims**

1. A process for preparing a resin-coated sand for use in shell molds and cores, said process comprising the steps of

(a) mixing the sand with phenolformaldehyde resin and an amount of salicylic acid comprising at least about 3% of the weight of the resin, said mixing being carried out at a temperature above the melting point of said resin so as to form a coating of the resin on the sand,

(b) and cooling and setting the resin on the sand to solidify the resin coating.

4,090,996

MULTICOMPONENT POLYESTER-BLOCK COPOLYMER-POLYMER BLENDS

William P. Gergen, and Sol Davison, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 693,463, Jun. 7, 1976, abandoned. This application May 5, 1977, Ser. No. 794,164
Int. Cl.[2] C08L 67/00, 51/00, 53/00
U.S. Cl. 260—40 R **18 Claims**

1. A composition comprising the admixture obtained by intimately mixing about 4 to about 40 parts by weight of a block copolymer, about 5 to about 48 parts by weight of at least one dissimilar engineering thermoplastic, and a saturated thermoplastic polyester in a weight ratio of polyester to dissimilar engineering thermoplastic of greater than 1:1, so as to form a polyblend wherein at least two of the polymers have at least partial continuous interlocked networks with each other and wherein:

(a) said block copolymer comprises at least two monoalkenyl arene polymer end blocks A and at least one substantially completely hydrogenated conjugated diene polymer mid block B, said block copolymer having an 8 to 55 percent by weight monoalkenyl arene polymer block content, each polymer block A having an average molecular weight of between about 5,000 and about 125,000, and each polymer block B having an average molecular weight of between about 10,000 and about 300,000;

(b) said saturated thermoplastic polyester has a generally crystalline structure and a melting point over about 120° C; and

(c) said dissimilar engineering thermoplastic resin is capable of forming a continuous structure and is selected from the group consisting of poly(aryl ethers), poly(aryl sulfones), polycarbonates and acetal resins.

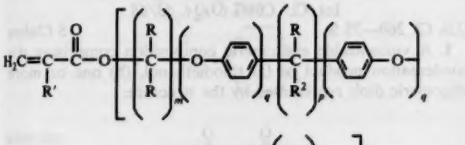
4,090,997
HIGH-STRENGTH ANAEROBIC SEALANT COMPOSITION AND METHOD OF PREPARATION

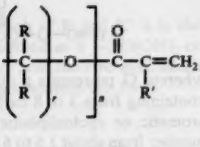
Purshottam S. Patel, Elk Grove Village, and Donald J. McDowell, Riverside, both of Ill., assignors to Felt Products Mfg. Co., Skokie, Ill.

Filed Mar. 5, 1976, Ser. No. 664,391
Int. Cl.[2] C09J 5/00; C08F 2/02
U.S. Cl. 260—47 UA 27 Claims

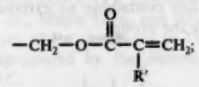
1. A relatively high-strength anaerobic sealant composition having an extended shelf life in the presence of air and capable of polymerization upon exclusion of air which comprises

a polyacrylic ester monomer represented by the general formula

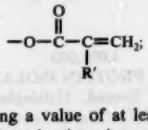




wherein R is a member of the group consisting of hydrogen, alkyl containing 1 to 4 carbon atoms, inclusive, hydroxyalkyl containing 1 to 4 carbon atoms, inclusive, and



R' is a member of the group consisting of hydrogen, halogen, and alkyl containing 1 to 4 carbon atoms, inclusive; R^2 is a member of the group consisting of hydrogen, alkyl containing 1 to 4 carbon atoms, inclusive, hydroxy, and



m is an integer having a value of at least 1; *n* is an integer having a value of at least 1; *p* is an integer having a value of 0 or 1; *q* is an integer having a value of 0 or 1; and *r* is an integer having a value of at least 1;

an inorganic salt initiator which is a member of the group consisting of ammonium perchlorate, alkali metal perchlorate, alkaline earth metal perchlorate, ammonium persulfate, alkali metal persulfate, and alkaline earth metal persulfate, present in an amount sufficient to initiate polymerization of the monomer in the absence of air;

a modifier which is a N-nitroso amine present in an amount of about 0.1 to about 1 part by weight per 100 parts of said monomer;

an accelerator present in an amount sufficient to accelerate polymerization of the monomer in the absence of air; and

a quinone-type polymerization inhibitor in an amount sufficient to retard polymerization of the monomer during storage of the composition in the presence of air.

4,090,998
CROSS-LINKED WATER-SWELLABLE INDENE-MALEIC ANHYDRIDE INTERPOLYMERS

Gary W. Dirks, Bedford Heights; George S. Li, Aurora, and John F. Jones, Cuyahoga Falls, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

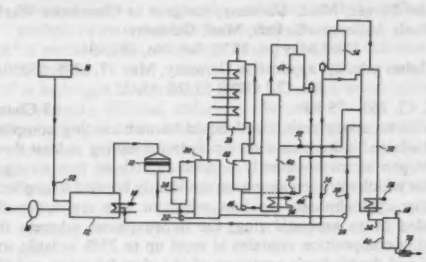
Filed Nov. 26, 1976, Ser. No. 745,203
Int. Cl.[2] C08F 222/06
U.S. Cl. 260—63 R 5 Claims

1. The cross-linked, water-swellable solid polymer composition which results from the polymerization in an inert organic diluent in the presence of a free-radical initiator at a temperature in the range of 0° to 100° C of a mixture of substantially equimolar amounts of maleic anhydride and indene and from 0.01 to 10% by weight based on the combined weight of maleic anhydride and indene of a cross-linking monomer having a plurality of polymerizable $CH_2{=}C<$ groupings.

4,090,999
PROCESS FOR THE PRODUCTION OF UREA-FORMALDEHYDE ADHESIVES OR RESINS AND PRODUCTS OBTAINED THEREBY

Pedro Mir Puig, Paseo de San Juan 15, Barcelone, Spain

Filed May 3, 1976, Ser. No. 682,208
Claims priority, application United Kingdom, Feb. 18, 1976, 06356/76; Germany, Feb. 17, 1976, 2606269; Netherlands, Feb. 16, 1976, 7601572
Int. Cl.[2] C08G 12/12; C07C 45/16
U.S. Cl. 260—69 R 11 Claims



1. In a process for the production of a urea-formaldehyde reaction product of the class consisting of urea-formaldehyde adhesives and urea-formaldehyde resins wherein

a. methanol is catalytically oxidized with air to produce a partially condensible gaseous product containing formaldehyde and (h) formaldehyde from said methanol oxidation is reacted with urea under conditions of suitable pH and temperature to produce said urea-formaldehyde product, the improvement comprising the steps of:

b. condensing said partially condensible gaseous product emanating from said catalytic oxidation of methanol whereby condensible components therein are condensed in the form of a solution;

c. separating the solution containing condensed components in step (b) from the uncondensed gases remaining after said condensation step;

d. cooling the uncondensed gases from step (c) and washing the cooled gas in a washing column with a solution comprising cold polymerized formaldehyde which takes up the methanol and formaldehyde present in the uncondensed gas;

e. distilling the solution obtained in step (c) in order to recover separately methanol and a concentrated aqueous formaldehyde solution, the formaldehyde content of which is at least partially in polymerized form;

f. distilling the solution obtained in step (d) in order to recover the methanol taken up into said solution and to isolate the formaldehyde in the form of an aqueous solution thereof containing polymerized formaldehyde;

g. passing a portion of the aqueous formaldehyde solution obtained in step (f) to distillation step (e) and recycling another portion of the aqueous formaldehyde solution obtained in step (f) to step (d) as the cold polymerized washing solution therein; and

utilizing in step (h) for reaction with urea the aqueous formaldehyde solution containing formaldehyde polymer obtained in step (e).

4,091,000

POLYURETHANE ELASTOMERS BASED ON HETEROCYCLIC POLYESTER DIOLS

Oskar Schmidt, Kittsee, Austria, assignor to Lim Holding S.A., Luxembourg, Luxembourg

Filed Mar. 16, 1976, Ser. No. 667,294

Claims priority, application Austria, Mar. 17, 1975, 2052/75

Int. Cl.[2] C08G *18/34, 63/16*

U.S. Cl. 260—75 NQ **3 Claims**

1. A reaction product of a polyester diol having a molecular weight of about 5000 and diphenyl methane-4,4'-diisocyanate in an amount of about 2 moles of the diisocyanate to about 1 mole of the polyester diol, the polyester diol being formed by the reaction of 1.2 moles of ethylene glycol, 1.7 moles of adipic acid and 0.6 moles of BIS-[5,5-dimethyl-3-(2-hydroxy ethyl)-hydantoinyl] methane.

4,091,001

LIQUID COATING COMPOSITIONS CONTAINING GLYCIDYL ESTER-POLYAMINE BINDERS

Dieter Berger, Marl, Germany, assignor to Chemische Werke Huels Aktiengesellschaft, Marl, Germany

Filed May 14, 1976, Ser. No. 686,494

Claims priority, application Germany, May 17, 1975, 2522043

Int. Cl.[2] C08G *63/20, 63/12*

U.S. Cl. 260—75 EP **13 Claims**

1. In an epoxy resin-based liquid varnish coating composition whose binder comprises a polyamine having at least three hydrogen atoms covalently bonded to at least two nitrogen atoms which nitrogen atoms are covalently bonded to aliphatic and/or cycloaliphatic residues which in turn are optionally bonded to an aromatic ring, the improvement wherein the coating composition contains at most up to 25% volatile solvent and the binder is a mixture of (A) glycidyl esters and (B) one or more of said polyamines, in a ratio such that the binder contains 0.8–1.5 amino hydrogen group equivalents per epoxide equivalent of glycidyl ester, wherein the glycidyl esters have 1.8–2.5 epoxide equivalents/mole, an epoxy number of 0.15–0.4 epoxide equivalents/100 g., a hydroxyl number of 20–130 mg. KOH/g. and a number average molecular weight of 450–1500, and are prepared by glycidylating an esterification product containing free carboxyl groups with a molar excess of a 2,3-epoxyhaloalkane in the presence of an agent which splits off hydrogen halide, said esterification product having an acid number of 100–350 l mg. KOH/g., a hyroxyl number of 0–100 mg. KOH/g., an average molecular weight of 350–1300 and an average degree of polymerization of 2.9–9 and wherein the esterification product is prepared by condensing a reaction mixture consisting essentially of:

a. 100–50 molar percent of at least one aliphatic or cycloaliphatic diol wherein the hydroxyl functions are separated from each other by 2–12 carbon atoms and 0–2 of said carbon atoms are substituted by an oxygen atom which oxygen atoms when present are separaged by at least 2 carbon atoms from each other and from the hydroxyl groups, and correspondingly 0–50 molar percent of at least one aliphatic polyol of 3–6 carbon atoms having 3 or 4 hydroxyl groups; and

b. a mixture of 15–50 molar percent of at least one saturated aliphatic dicarboxylic acid of 4–12 carbon atoms or an intramolecular anhydride thereof, and correspondingly 85–50 molar percent of at least one aromatic or cycloaliphatic dicarboxylic acid other than terephthalic acid of 6–12 ring carbon atoms or an intramolecular anhydride thereof, or a corresponding mixture thereof and up to 30 molar percent of an aromatic polycarboxylic acid having 3 or more carboxyl groups or an intramolecular anhyride thereof.

4,091,002

VULCANIZABLE ELASTOMER FROM THIODIETHANOL AND AN OLIGOMERIC POLYESTER

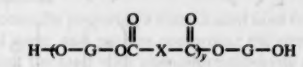
Tsi Tieh Li, Milltown, and Robert Saxon, Princeton, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Oct. 14, 1976, Ser. No. 731,976

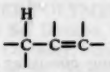
Int. Cl.[2] C08G *63/54, 63/68*

U.S. Cl. 260—75 S **5 Claims**

1. A vulcanizable elastomeric composition comprising the condensation product of (a) thiodiethanol, (b) one or more oligomeric diols represented by the structure:



wherein G represents a divalent, open-chain alkylene group containing from 3 to 8 carbon atoms, X represents a divalent aromatic or cycloaliphatic hydrocarbon radical, and *y* is a number from about 1.5 to 6, and (c) one or more aliphatic diols different from (a) or (b); said composition being characterized as comprising at least about 50 mole percent thiodiethanol, from about 0.5 to about 8 mole percent of said oligomeric diol, the remainder being said aliphatic diol or diols, and further provided that from about 1 to 10 mole percent thereof comprises an aliphatic diol containing an external allylic double bond represented by the group:



4,091,003

FISH PROTEIN ISOLATE

Sven Ingmar Walton Bosund, Helsingborg; Bengt Lennart Bengtsson, Bjuv, and Karl Bertil Lennart Ostman, Kagerod, all of Sweden, assignors to Societe d'Assistance Technique Pour Produits Nestle S.A., Lausanne, Switzerland

Filed May 21, 1973, Ser. No. 362,341

Claims priority, application United Kingdom, May 22, 1972, 23933/72

Int. Cl.[2] A23J *1/04*

U.S. Cl. 260—112 R **2 Claims**

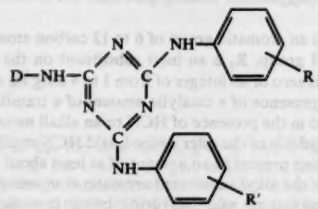
1. A process for preparing a protein isolate from fish material having a lipid content not exceeding 0.5% by weight, comprising treating said fish material with aqueous alkali at a pH of 10 to 12 and a temperature of 80° to 100° C. for a period of time of 1 to 5 minutes, removing insoluble material from the alkali solution, and thereafter desalting and deodorizing the solution, desalting of said alkali solution being accomplished by exchange of ammonium ions for cations present in said solution, followed by removal of ammonium ions from the solution by vaporization as ammonia.

4,091,004
TRIAZINE DYES REACTIVE THROUGH THEIR PHOSPHORUS ACID GROUPS

Bobby Lee McConnell, Greensboro, N.C.; Raymond Thornton, Lake Placid, N.Y., and Louis Atkins Graham, Greensboro, N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.

Filed Jul. 30, 1976, Ser. No. 710,152
Int. Cl.[2] C09B *62/00, 62/44;* D06P *1/384, 3/66*
U.S. Cl. 260—153 10 Claims

1. A dye of the formula:



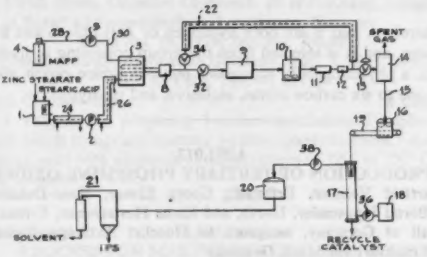
wherein:

D represents chromophore and each of R and R′ is in the meta or para position and is defined as a $—PO(OH)_2$ or $—O—PO(OH)_2$ wherein the dye is in the free acid, alkali metal salt, ammonium or acid ammonium salt form.

4,091,005
CONTINUOUS PROCESS FOR PREPARATION OF ISOPROPENYL STEARATE

James C. Craig, Jr., Maple Glen, and Michael F. Kozempel, Warminster, both of Pa., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Oct. 4, 1976, Ser. No. 729,443
Int. Cl.[2] C11C *3/02*
U.S. Cl. 260—410.9 N 8 Claims



1. A process for the preparation of isopropenyl stearate comprising the steps of:

(a) reacting stearic acid and propyne by simultaneously and continuously pumping stablizied propyne and a comelt of stearic acid and zinc stearate into and through a reaction zone, the molar ratio of propyne to stearic acid being at least 0.9, the stearic acid and zinc stearate being present in said comelt at a ratio of 48:52 by weight and said mixture reacting at about 410° to 420° F under 550 psig.;

(b) flashing off spent reaction gas;

(c) crystallizing the product on chilled flaker rolls;

(d) leaching the crystallized product to remove catalyst; and

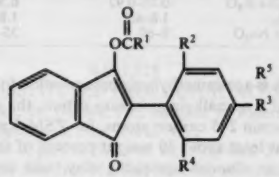
(e) removing the solvent from the product.

4,091,006
ESTERS OF 3-HYDROXYINDONE COMPOUNDS

John A. Durden, Jr., South Charleston; Anthony A. Sousa, St. Albans, both of W. Va., and John F. Stephen, New City, N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Continuation of Ser. No. 314,370, Dec. 12, 1972. This application Oct. 1, 1975, Ser. No. 618,837
Int. Cl.[2] C09F *5/08, 7/10;* C07C *125/06, 69/02, 101/00*
U.S. Cl. 260—410.5 46 Claims

1. As new compositions of matter, the chemical compound having the structural formula:



wherein:

R^1 is hydrogen, halogen or an organic radical which does not interfere with hydrolysis of the ester moiety to which it is attached;

R^2 is hydrogen, methyl, ethyl, methoxy, ethoxy, fluorine, chlorine, bromine, trichloromethyl, trifluoromethyl or mixed chlorofluoromethyl;

R^3 is hydrogen, lower alkyl, lower alkoxy, fluorine, chlorine, bromine, nitro, acylamido, trichloromethyl, trifluoromethyl, or mixed chlorofluoromethyl;

R^4 is methyl, ethyl, methoxy, ethoxy, fluorine, chlorine or bromine;

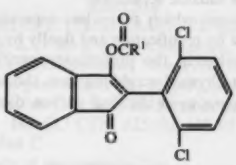
R^5 is hydrogen, lower alkyl, lower haloalkyl, lower alkoxy, acylamido, fluorine, chlorine or bromine;

R^6 is hydrogen, lower alkyl, lower alkoxy, fluorine, chlorine, bromine, trifluoromethyl, trichloromethyl or acylamido;

n is a small whole number from 1 to 4; and

R^2 and R^5 or R^4 and R^5 taken together, may be $—CH=•CH—CH=CH—$ with the proviso that when R^4 is ethyl, methoxy or ethoxy, R^2, R^3 and R^5 may not all be hydrogen.

27. As new compositions of matter, the chemical compounds having the structural formula:



wherein R^1 is alkyl.

34. New compositions of matter in accordance with claim 27 wherein R^1 is heptadecyl.

4,091,007
PREPARATION OF ZEOLITES

Francis G. Dwyer, West Chester, and Albert B. Schwartz, Philadelphia, both of Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 311,190, Dec. 1, 1972, abandoned, which is a continuation-in-part of Ser. No. 886,401, Dec. 18, 1969, abandoned. This application Oct. 30, 1975, Ser. No. 627,158
Int. Cl.[2] C01B *33/28;* C07F *5/06*
U.S. Cl. 260—448 C 18 Claims

1. In a method for preparing a crystalline aluminosilicate zeolite from a reaction mixture containing sources of alkali metal cations, tetraalkylammonium cations, silica, alumina and

water, said reaction mixture being maintained at a temperature of from about 75° C to about 205° C for from about 1 hour to about 60 days to crystallize said zeolite therefrom, the improvement wherein said zeolite is ZSM-4 or ZSM-5, characterized by a crystallinity of greater than 40 percent at the time of formation, prepared from a reaction mixture having the following compositional range in terms of mole ratios of oxides:

	ZSM-4	ZSM-5
Na_2O+R_2O/Al_2O_3	0.60–1.75	0.15–0.85
Na_2O+R_2O/SiO_2	0.24–0.65	0.04–0.18
Na_2O/Na_2O+R_2O	0.75–0.92	0.30–0.85
SiO_2/Al_2O_3	1.8–4.3	1.8–6.0
H_2O/R_2O+Na_2O	9–60	35–360

wherein R is a tetramethylammonium cation for ZSM-4 preparation and a tetraalkylammonium cation, the alkyl groups of which contain 2–5 carbon atoms, for ZSM-5 preparation, and wherein at least about 70 weight percent of the Al_2O_3 is provided by an alumina-containing clay, said clay having been heated to a temperature of at least 1000° F, and further wherein the SiO_2 in the reaction mixture is provided such that the ratio of SiO_2 from a non-clay source/SiO_2 from said clay is from 0 to about 5.

4,091,008

PRODUCTION OF A GAS RICH IN METHANE

Alan Watson, Ottobrunn; Peter Hohmann, Munich; Herbert Schmid, Raitenhaslach-Haslach, and Helmut Schneider, Grunwald, all of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Germany

Filed Aug. 22, 1975, Ser. No. 606,895
Claims priority, application Germany, Aug. 23, 1974, 2440456
Int. Cl.² C07C *1/04*
U.S. Cl. 260—450 **6 Claims**

1. In a process for the production of a methane-rich gas from a feed gas containing carbon monoxide and hydrogen wherein the feed gas, after preliminary purification thereof is warmed, then subjected to a multistage, catalytic methanization in the presence of steam, to obtain a methane-rich gas having a CO_2 partial pressure above 6 atmospheres which thereupon is subjected to carbon dioxide separation

the improvement which comprises separating the carbon dioxide first by rectification and finally by physical scrubbing and wherein the preliminary purification is conducted as a physical scrubbing step, the scrubbing liquid being the same as in the final carbon dioxide separation step.

4,091,009

PROCESS FOR DEACTIVATING TOLUENE DIISOCYANATE DISTILLATION RESIDUE

John R. Cassata, Sulphur, La., assignor to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 714,533, Aug. 16, 1976, abandoned. This application Mar. 23, 1977, Ser. No. 780,562
Int. Cl.² C07C *118/02, 119/048*
U.S. Cl. 260—453 PH **16 Claims**

1. A process for converting into an inert, granular solid the substantially solvent-free residue which is obtained from the distillation of the product of phosgenating toluene diamine to the corresponding toluene diisocyanate, which process comprises heating said residue to a temperature from about 60° F to about 150° F in the presence of an aqueous solution of a base selected from the group consisting of ammonia and an alkaline earth metal hydroxide.

4,091,010

PROCESS FOR THE PREPARATION OF CYANOHYDRIN ESTERS

Richard V. Norton, Wilmington, Del., assignor to Suntech, Inc., Wayne, Pa.

Filed Oct. 28, 1976, Ser. No. 736,667
Int. Cl.² C07C *120/00, 121/66*
U.S. Cl. 260—465 D **4 Claims**

1. The process of making a cyanohydrin ester of an alkyl-substituted aromatic acid which comprises the liquid phase oxidation of an alkyl aromatic compound of the structure

$$R_1\text{-}A_2\text{-}(R_2)_n$$

where A_2 is an aromatic group of 6 to 12 carbon atoms, R_1 is a lower alkyl group, R_2 is an inert substituent on the aromatic ring and n is zero or an integer of from 1 to 4 usng air as oxidant and in the presence of a catalytic amount of a transition metal catalyst and in the presence of HCN or an alkali metal cyanide and an anhydride of the ester desired, said HCN or alkali metal cyanide being present in an amount of at least about one mole per mole of the alkyl substituted aromatic compound oxidized and the amount of said anhydride being in stoichiometric excess of the oxidation reaction up to a 10 molar excess.

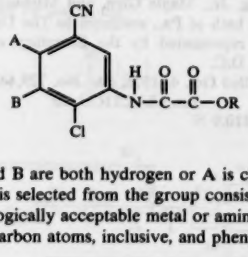
4,091,011

3-CYANO-OXANILIC ACID DERIVATIVES

John B. Wright, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 477,815, Jun. 10, 1974, abandoned. This application Nov. 24, 1976, Ser. No. 744,692
The portion of the term of this patent subsequent to Oct. 19, 1993, has been disclaimed.
Int. Cl.² C07C *121/78*
U.S. Cl. 260—465 D **7 Claims**

1. Compounds of the structure



wherein A and B are both hydrogen or A is chloro and B is amino, and R is selected from the group consisting of hydrogen, a physiologically acceptable metal or amine cation, alkyl of one to six carbon atoms, inclusive, and phenyl.

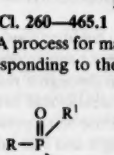
4,091,012

PRODUCTION OF TERTIARY PHOSPHINE OXIDES

Hartfrid Vollmer, Erftstadt; Georg Elsner, Bonn-Duisdorf; Bernd Lippsmeier, Hurth, and Klaus Hestermann, Erftstadt, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Mar. 24, 1977, Ser. No. 780,989
Claims priority, application Germany, Mar. 30, 1976, 2613546
Int. Cl.² C07C *120/00*
U.S. Cl. 260—465.1 **7 Claims**

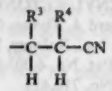
1. A process for making tertiary cyanoalkylphosphine oxides corresponding to the following general formula I:



I

in which R^1 and R^2 each stand for a straight or branched, identical or different alkyl group having 1 to 6 carbon atoms,

and in which R^1 or R^2 may be identical with R, which stands for a radical of the following general formula II:

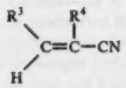


II

in which R^3 and R^4 each stand for a straight or branched, identical or different alkyl group having 1 to 6 carbon atoms, or a hydrogen atom, which comprises: reacting under inert gas a phosphine of the following general formula III:

III

in which R^5 has the same meaning as R^3 and R^6 has the same meaning as R^4 but is no hydrogen, in the stoichiometric ratio necessary for the formation of the formula I compound with an α,β-unsaturated nitrile of the following general formula IV:



IV

in which R^3 and R^4 have the meanings given above, the reaction being effected in a single stage at a temperature between 0° and 35° C in the presence of water or water-solvent mixture and a catalyst selected from the group consisting of a chloride, sulfate and acetate of cadmium, nickel, manganese and cobalt in a proportion of 0.1 to 10 millimols in admixture with ammonia or an alkali metal or alkaline earth metal hydroxide in a proportion of 0.01 to 0.2 mol based on the reactants, and separating the above formula I compounds from the reaction product.

4,091,013

PROCESS FOR PREPARING 1-AMINO-NAPHTHALENE-7-SULPHONIC ACID

Rolf Pütter, Dusseldorf; Günther Klag, Leverkusen, and Heinz Ulrich Blank, Odenthal-Gloebusch, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jul. 16, 1976, Ser. No. 706,099

Claims priority, application Germany, Aug. 7, 1975, 2535337

Int. Cl.[2] C07C *143/60, 85/04*

U.S. Cl. 260—508 **8 Claims**

1. Process for preparing 1-amino-naphthalene-7-sulphonic acid which comprises reacting 1-chloro-naphthalene-4,7-disulphonic acid with ammonia at temperatures of 220° to 350° C in the presence of water.

4,091,014

PROCESS FOR MAKING ETHER SULFONATES

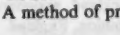
Fred L. Johnson, Jr., Austin, Tex., and John A. Patterson, Fishkill, N.Y., assignors to Texaco Development Corporation, New York, N.Y.

Filed Dec. 1, 1976, Ser. No. 746,563

Int. Cl.[2] C07C *143/42, 143/11*

U.S. Cl. 260—512 R **34 Claims**

1. A method of preparing ether sulfonates of the formula:



where R is a radical selected from the group consisting of C_2–C_{22} alkyl, C_2–C_{22} alkenyl, C_2–C_{22} hydroxyalkyl, C_2–C_{22} hydroxyalkenyl, alkaryl containing 1 or more C_1–C_{18} alkyl groups substituted on said aryl group, aralkyl containing 7–28 carbon atoms, and polyalkyleneether derivatives of any of the foregoing, R_3 is alkylene, and A is an alkali metal cation which comprises the step of reacting in the presence of a base and in the liquid phase an alcohol having a molecular weight greater than 200 and having the formula, ROH where R has the just stated significance, with an alkali metal hydroxy-containing alkyl sulfonic acid salt under a vacuum less than about 300 mm of mercury while for at least the majority of said reaction period continuously dispersing an inert gas through said liquid reaction mass.

4,091,015

15-SUBSTITUTED PROSTANOIC ACIDS

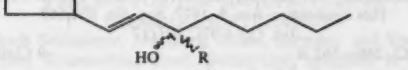
Donald P. Strike, St. Davids, Pa., assignor to American Home Products Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 301,571, Oct. 27, 1972, abandoned, and Ser. No. 462,006, Apr. 18, 1974, abandoned, which is a continuation-in-part of Ser. No. 383,007, Jul. 26, 1973, Pat. No. 3,922,302. This application May 17, 1974, Ser. No. 470,772

Int. Cl.[2] C07C *177/00*

U.S. Cl. 260—520 B **2 Claims**

1. A prostaglandin of the formula:



wherein R is benzyl; and R^1 is hydrogen, alkyl of from 1 to about 6 carbon atoms, alkali metal, or a pharmacologically acceptable cation derived from ammonia or a basic amine.

4,091,016

THIOSULFENYLCARBAMOYL HALIDES

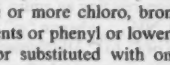
Themistocles D. J. D'Silva, South Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 486,631, Jul. 8, 1974. This application Oct. 2, 1975, Ser. No. 618,889

Int. Cl.[2] C07C *125/00, 125/03*

U.S. Cl. 260—544 C **11 Claims**

1. Compounds of the formula:



wherein:

X may be fluorine or chlorine.

R may be lower alkyl, lower alkenyl or lower alkyl substituted with one or more chloro, bromo, fluoro, nitro or cyano substituents or phenyl or lower phenyl alkyl either unsubstituted or substituted with one or more chloro, bromo, fluoro, nitro, cyano, lower alkyl, lower haloalkyl or lower alkoxy substituents.

R_1 may be alkyl, alkenyl, cycloalkyl, bicycloalkyl, cycloalkenyl or bicycloalkenyl or lower phenylalkyl or phenyl; or lower phenylalkyl or phenyl substituted with one or more chloro, bromo, fluoro, nitro, cyano, lower alkyl, lower alkoxy, lower haloalkyl, lower alkanoyl or carbamoyl substituents.

4,091,017

METHOD OF PREPARING TEREPHTHALIC ACID DICHLORIDE AND ISOPHTHALIC ACID DICHLORIDE

Hermann Richtzenhain, Much-Schellenbach, and Paul Riegger, Troisdorf, Sieglar, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf Bez. Koeln, Germany

Continuation of Ser. No. 513,782, Oct. 10, 1974, abandoned. This application Jul. 12, 1976, Ser. No. 704,279

Claims priority, application Germany, Oct. 11, 1973, 2351030

Int. Cl.[2] C07C *51/58*

U.S. Cl. 260—544 D **17 Claims**

1. In a process for producing at least one of terephthalic acid dichloride and isopthalic acid dichloride by hydrolysis of the corresponding bis-trichloromethyl benzene with water in the presence of a Friedel-Crafts catalyst, the improvement which comprises the water being a gas, and introducing said bis-trichloromethyl benzene, water, catalyst and said dichloride into a reaction zone for said hydrolysis, and maintaining at least one of said dichlorides present throughout the hydrolysis in the proportion of at least 0.4 parts of said dichloride to 1 part of the bis-trichloromethyl benzene present initially on a weight basis.

4,091,018

NOVEL 1,2,3,4-TETRAHYDRO-4-OXO-(-OXY-)-1-NAPHTHYLAMINES AND METHOD OF PREPARATION THEREOF

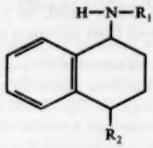
Goro Asato, Titusville, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 685,945, May 13, 1976, Pat. No. 4,049,717. This application Jun. 8, 1977, Ser. No. 804,669

Int. Cl.[2] C07C *103/37*

U.S. Cl. 260—562 R **9 Claims**

1. A compound of the formula:



wherein R_1 is alkanoyl C_1-C_7 and R_2 is oxo, hydroxy or alkoxy C_1-C_4; the racemic mixtures and the optical isomers thereof; and the cis and trans isomers thereof when R_2 is hydroxy or alkoxy C_1-C_4.

4,091,019

PREPARATION OF UNSATURATED PRIMARY AMINES

Robert A. Keppel, University City, and John S. McConaghy, Jr., St. Louis, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Apr. 27, 1976, Ser. No. 680,569

Int. Cl.[2] C07C *85/145, 87/24*

U.S. Cl. 260—585 R **8 Claims**

1. A process for the production of unsaturated primary amines which comprises reacting an amine having the formula $(R_1HC{=}CR_2{-}CH_2)_mNH_{(3-m)}$ wherein "m" is 2 or 3 and R_1 and R_2 are each hydrogen or C_1 to C_3 alkyl groups with ammonia in the presence of a catalyst comprised of zero-valent palladium or platinum atoms bearing phosphorus-containing ligands and a catalyst promoter selected from the group consisting of ammonium acetate and ammonium chloride in a molar ratio of promoter to catalyst that is from 1:1 to 10:1, the reaction being carried out at a temperature of from 0° C. to 250° C. in the substantial absence of molecular oxygen and in the presence of a solvent for the amine.

4,091,020

METHOD FOR THE PREPARATION OF DI-BICYCLO[3.1.1] AND [2.2.1]HEPTYL AND DI-BICYCLO-[3.1.1] AND [2.2.1]HEPTENYL KETONES

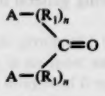
Nathaniel Grier, Englewood, N.J., and Richard A. Dybas, Center Square, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 609,772, Sep. 2, 1975, Pat. No. 4,003,934. This application Aug. 23, 1976, Ser. No. 716,411

Int. Cl.[2] C07C *45/18*

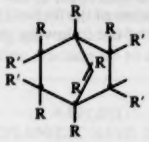
U.S. Cl. 260—586 C **3 Claims**

1. A method of preparing a compound of the formula:

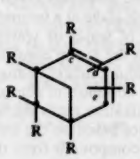


where:

each A is a [2.2.1] bicyclic group of the formula:



or a [3.1.1] bicyclic group of the formula:

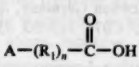


b)

where R is alike or different and is hydrogen or C_1 to C_4 alkyl, R′ is alike or different and is hydrogen or C_1 to C_4 alkyl or R′ on adjacent carbon atoms taken together comprise an olefinic bond, and the dashed line indicates either saturation or c-, d- or d-, e- unsaturation;

each R_1 is C_1 to C_4 alkylene; and

each *n* is the integer 0 or 1; comprising condensing an acid of the formula:



where A, R_1 and *n* have their previously defined meanings at a temperature of from 195° to 200° C. for a period of at least two hours, and thereafter increasing the temperature to from 290° to 295° C. for at least three additional hours in the presence of a catalyst selected from the group consisting of iron oxide, polyphosphoric acid, boron trifluoride, alkaline earth oxides, transition metals and thoria aerogel.

4,091,021

AZO DYESTUFFS

Herbert Francis Andrew; David William Crichton Ramsay, and Cecil Vivian Stead, all of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Mar. 18, 1976, Ser. No. 668,034

Claims priority, application United Kingdom, Apr. 30, 1975, 18013/75

Int. Cl.[2] C09B *46/00*

U.S. Cl. 260—191 **6 Claims**

1. An azo dyestuff having the formula

A—N=N—M—N=N—E

wherein

A is a benzene radical having a phosphonic acid group and optionally containing a further substituent selected from the group consisting of methyl, chlorine, methoxy and nitro,

M is a 1,4 phenylene radical optionally containing up to 2 substituents selected from the group consisting of methyl, methoxy, phosphonomethyl, acetylamino and carboxylic acid, and

E is the residue of a coupling component selected from the group consisting of naphthol sulphonic acid, aminonaphthol sulphonic acid and lower alkanoylaminonaphthol sulphonic acid.

4,091,022

POLYAMIDE FIBER

Sylvia Etchells, Pontypool, England, assignor to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 304,867, Nov. 8, 1972. This application May 25, 1977, Ser. No. 800,242

Int. Cl.² C08L 77/00; B29H 7/20

U.S. Cl. 260—2.5 N **3 Claims**

1. A conductive fibre comprising a fibre-forming polyamide having dispersed therein as a separate phase between 1% and 14% by weight inclusive of an additive which is derived from a boric acid and a polyoxyalkylene glycol of average molecular weight in the range up to 30,000.

4,091,023

DIBENZ[b,f]OXEPIN DERIVATIVES

Max Gerecke; Emilio Kyburz, both of Reinach, Switzerland, and Jean-Pierre Kaplan, Le Plessis Robinson, France, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

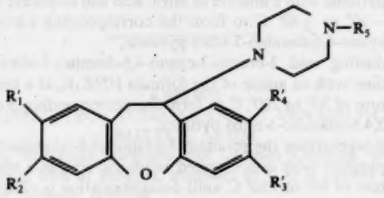
Division of Ser. No. 534,033, Dec. 18, 1974, Pat. No. 4,032,525. This application Mar. 18, 1977, Ser. No. 779,197

Claims priority, application Switzerland, Jan. 4, 1974, 62/74; Nov. 20, 1974, 15369/74

Int. Cl.² C07D 405/04

U.S. Cl. 544—378 **2 Claims**

1. A compound of the formula



wherein one of R_1' and R_2' is hydrogen and the other is halogen, lower alkyl, lower alkoxy, lower alkylthio, or trifluoromethyl; one of R_3' and R_4' is hydrogen and the other is hydrogen, halogen, lower alkyl, lower alkoxy, lower alkylthio, or trifluoromethyl; and R_5 is lower alkanoyl, hydroxy-lower alkanoyl or lower alkoxycarbonyl.

4,091,024

PYRROLIDINE AND PIPERIDINE-2-CARBOXYLIC ACID DERIVATIVES

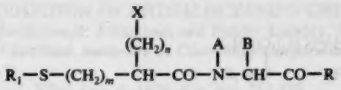
Miguel Angel Ondetti, Princeton, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Dec. 3, 1976, Ser. No. 747,282

Int. Cl.² C07D 211/20

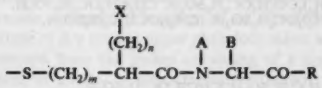
U.S. Cl. 260—293.63 **14 Claims**

1. A compound of the formula



and salts thereof,

wherein R is hydroxy or lower alkoxy; R_1 is hydrogen, lower alkanoyl, benzoyl or



A and B together form a $(CH_2)_p$ bridge which completes an unsubstituted ring of 5 or 6 atoms with the nitrogen and carbon to which they are joined or said ring substituted with a hydroxy group;

X is carboxy, lower alkoxycarbonyl, carbamoyl, N-substituted carbamoyl wherein N-substituent is lower alkyl or phenyl-lower alkylene, or cyano:

m is 0 or 1;

n is 0, 1, 2, 3 or 4; and

p is 3 or 4.

4,091,025

PROCESS FOR THE MANUFACTURE OF NITROAMINOPYRIDINES

Ulrich Schlesinger, Maulburg, Baden, Germany, and Visvanathan Ramanathan, Basel, Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

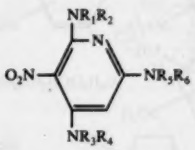
Filed Oct. 7, 1976, Ser. No. 730,403

Claims priority, application Switzerland, Oct. 24, 1975, 13798/75; Oct. 27, 1975, 13881/75

Int. Cl.² C07D 213/61

U.S. Cl. 260—294.8 F **8 Claims**

1. A process for the manufacture of 2,4,6-triamino-5-nitropyridines of the general formula



wherein

R_1, R_2, R_3, R_4, R_5 and R_6 independently represents hydrogen;

alkyl of 1 to 10 carbon atoms which are unsubstituted or substituted by hydroxy, carboxy, C_2–C_{10} carbalkoxy, C_1–C_8-alkoxy, phenoxy, pyrrolidonyl or C_1–C_{10} acyloxy;

phenyl which is unsubstituted or substituted by halo, lower alkyl, lower alkoxy, β-hydroxyethyl, cyano, C_1–C_5 alkanoylamino or lower carboalkoxy;

benzyl;

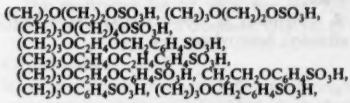
phenethyl;

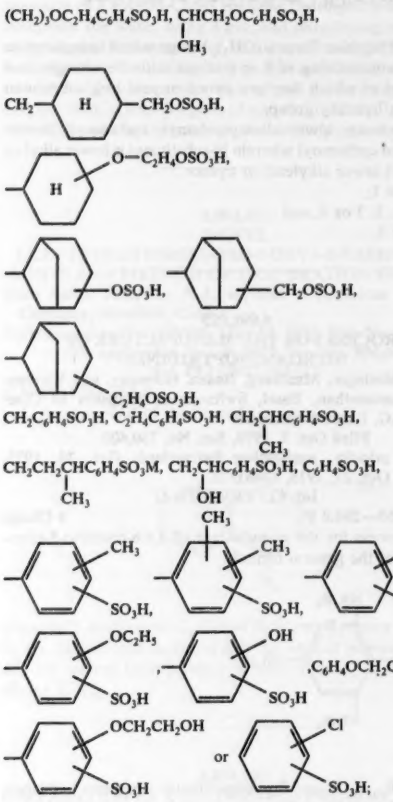
cycloalkyl;

a group of the formula

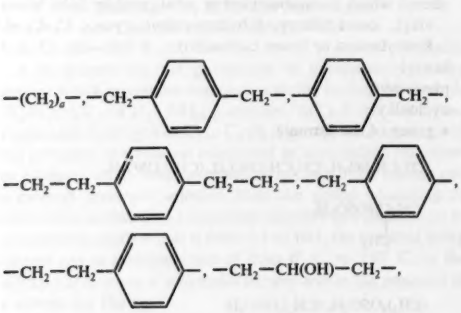
$CH_2CH_2SO_3H$, $CH_2CH_2OSO_3H$, $(CH_2)_3OSO_3H$,

$(CH_2)_4OSO_3H$, $(CH_2)_6OSO_3H$,





a group of the formula $-R_5'-Q$ wherein $-R_5'-$ is a group of the formula



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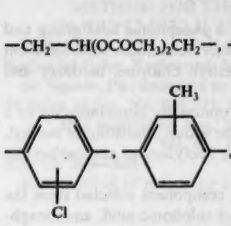
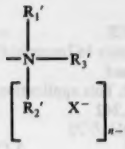


a is an interger from 1 to 12 and wherein Q is a group of the formula



where

R_1' and R_2' are hydrogen, C_1–C_4 alkyl, benzyl or cyclohexyl,

R_3' is hydrogen, C_1–C_4 alkyl, benzyl, cyclohexyl, alkoxy or amino; or

R_1', R_2' and R_3' are, together with the nitrogen to which they are attached, pyridyl,

n is 1 or 2, and

the anion X^- is chloride, bromide, iodide, nitrate, hydrogen sulphate, phosphate, benzenesulphonate, (nitro, chloro, bromo, C_1–C_4-alkyl or C_1–C_4-alkoxy)-benzenesulphonate, C_1–C_4 alkylsulphonate, or C_1–C_4 alkylsulphate; or the double salt thereof with zinc or cadmium halide; or

R_1 and R_2, R_3 and R_4 or R_5 and R_6 together with the nitrogen to which they are attached independently represent pyrrolidino, piperidino, piperazino, N-lower alkylpiperazino, (N-formyl- or N-lower alkylcarbonyl)-piperazino or morpholino;

which process comprises

nitrating the corresponding 2-bromo-3-cyano-4,6-diamino pyridine with a mixture of nitric acid and sulphuric acid at −20° to +40° C to form the corresponding 2-bromo-3-cyano-4,6-diamino-5-nitro pyridine,

aminating said 2-bromo-3-cyano-4,6-diamino-5-nitro pyridine with an amine of the formula HNR_5R_6 at a temperature of 30° to 200° C to form the corresponding 3-cyano-2,4,6-triamino-5-nitro pyridine,

and saponifying the resultant 3-cyano-2,4,6-triamino-5-nitro pyridine with concentrated sulphuric acid at a temperature of 90° to 150° C until decarboxylation is effected.

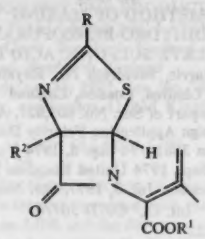
4,091,026

THIAZOLENEAZETIDINONES FROM DITHIAZENEAZETIDINONES

Ronald G. Micetich; Clinton G. Chin, both of Edmonton, Canada, and Robert B. Morin, Warren, N.J., assignors to Connlab Holdings Limited, Canada

Filed Oct. 15, 1975, Ser. No. 622,627
Int. Cl.[2] C07D *513/04*
U.S. Cl. 260—306.7 C **12 Claims**

1. The process of desulfurization for preparing a compound of the formula:



wherein:

R stands for phenoxyloweralkyl, phenylthioloweralkyl, benzyl, lower alkyl, phenyl, methylisoxazolyl, a-amino-benzyl and protected derivatives thereof selected from the group consisting of N-benzyloxycarbonyl, N-trichloroethoxycarbonyl, and N-methozymethozycarbonyl, 4-amino-r-carboxy-1-butyl, R^3O—, R^3S—, and R^3R^4N—

where

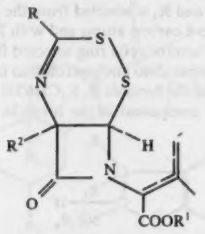
R^3 is lower alkyl, phenyl, or phenylloweralkyl,

R^4 is hydrogen or radical R^3,

R^2 is hydrogen or methoxy;

R^1 is hydrogen, lower alkyl, loweralkoxymethyl, phenoxymethyl, 2,2,2-trichloroethyl, benzyl, p-nitrobenzyl, benzhydryl, or trimethylsilyl,

which comprises the step of contacting a dithiazeneazetidinone of the formula:



R, R^1 and R^2 being the same as defined previously with iodine.

4,091,027

6'-AMINO-SPIRO(CYCLOALKANE-1,2'-PENAM)-3'-CARBOXYLIC ACIDS

Ludovic Rodriguez, Brussels, and Jacques Leclercq, Braine l'Alleud, both of Belgium, assignors to U C B Societe Anonyme, Brussels, Belgium

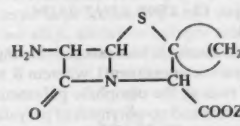
Filed May 24, 1977, Ser. No. 800,082

Claims priority, application United Kingdom, May 25, 1976, 21625/76

Int. Cl.² C07D *499/42*

U.S. Cl. 260—306.7 C **6 Claims**

1. A 6'-amino-spiro[cycloalkane-1,2'-penam]-3'-carboxylic acid, a salt or an ester thereof, of the formula



wherein Z is a hydrogen or an alkali metal atom, or a group protecting the carboxylic function, and *n* is a whole number of from 3 to 6.

4,091,028

PRODUCTION OF PHTHALOCYANINE GREEN

Ronald Barraclough, Johnstone, and Robert Langley, Glasgow, both of Scotland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Aug. 9, 1976, Ser. No. 712,577

Claims priority, application United Kingdom, Aug. 16, 1975, 34196/75

Int. Cl.² C09B *47/10*

U.S. Cl. 260—314.5 **16 Claims**

1. A process for the production of halogenated copper phthalocyanine comprising heating, at an elevated temperature, a mixture of dry crude copper phthalocyanine, an organic solvent selected from the group consisting of a high-boiling hydrocarbon, or a halo- or nitro-derivative thereof, a halogenating agent, a halogen transfer agent selected from the group consisting of anhydrous iron chloride, cuprous chloride, antimony sulphide, anhydrous zinc chloride, metallic iron, copper or iodine, and, as a catalyst, chlorosulphonic acid, and wherein 0.5 to 3 moles of chlorosulphonic acid are used per mole of copper phthalocyanine, and the proportion of pigment in the final reaction mixture is from 30% to 45% based on the weight of organic solvent.

4,091,029

N-PENTAFLUOROPROPIONYL AND N-HEPTAFLUOROBUTYRYL PROLINE

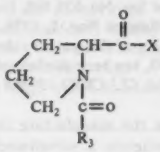
Rex W. Souter, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 518,661, Oct. 29, 1974, Pat. No. 3,972,925. This application Apr. 14, 1976, Ser. No. 676,943

Int. Cl.² C07D *207/16*

U.S. Cl. 260—326.2 **6 Claims**

1. A compound of the formula



wherein:

R_3 is pentafluoroethyl or heptafluoropropyl; and

X is chlorine, bromine, iodine, or hydroxyl.

4,091,030

PROTECTED GRAFT COPOLYMERS OF CYCLIC NITROGENOUS AND ESTER MONOMERS

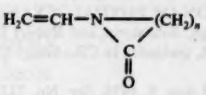
Nelson N. Schwartz, Teaneck, N.J., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Continuation-in-part of Ser. No. 438,222, Jan. 31, 1974, abandoned. This application Jun. 1, 1976, Ser. No. 691,274

Int. Cl.² C07D *207/26, 223/10, 211/78*

U.S. Cl. 260—326.25 **3 Claims**

1. A composition which comprises the reaction product of a free radical-initiated copolymerization of a cyclic nitrogenous monomer having the structural formula:



wherein n is 3, 4 or 5, and

an esterified unsaturated dibasic acid having the structural formula:

$$C_uH_{2u-2}(CO_2C_vH_{2v+1})_2$$

wherein u is 2 or 3, and v is an integer from 2 to 9,

said free radical-initiated copolymerization being carried out substantially to completion in the presence of a polyfunctional polyether polyol, which is the reaction product of the alkylene oxide treatment of water or a polyhydric alcohol having 2 to 8 hydroxyl groups and having a weight average molecular weight in the range of about 500 to about 5,000 which has been treated with a capping agent selected from the group consisting of acetic anhydride, acetyl chloride, ketene, benzoyl chloride, benzoic acid, methyl isocyanate, ethyl isocyanate, phenyl isocyanate, and butyric, caproic, capric, lauric, myristic, palmitic, stearic and oleic acids, vinyl methyl ether, vinyl isobutyl ether, N-butyl vinyl ether and 2,3-dihydrofuran to convert substantially all of the hydroxyl groups of said polyether polyol to groups substantially inert to isocyanates.

4,091,031
PROCESS FOR THE MANUFACTURE OF SUBSTITUTED THIANTHRENE BASED PRODUCTS

Harry E. Buckholtz, Kenmore, and Arun C. Bose, Tonawanda, both of N.Y., assignors to Hooker Chemicals & Plastics Corp., Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 521,108, Nov. 5, 1974, Pat. No. 3,997,560. This application Nov. 1, 1976, Ser. No. 737,320

The portion of the term of this patent subsequent to Dec. 14, 1993, has been disclaimed.

Int. Cl.² C07D *339/08*

U.S. Cl. 260—327 P **10 Claims**

1. The process for the manufacture of substituted thianthrene compounds wherein a substituted thianthrene compound is separated from a substituted thianthrene compound-aluminum chloride complex by admixing the complex with an inert organic liquid solvent for the substituted thianthrene compound to form a slurry therewith, and treating the slurry with a Lewis base to free the substituted thianthrene compound from the complex, and dissolving the substituted thianthrene compound in the organic liquid.

4,091,032
4-N-ACYLFORTIMICIN B DERIVATIVES AND THE CHEMICAL CONVERSION OF FORTIMICIN B TO FORTIMICIN A

John Soloman Tadanier; Jerry Roy Martin, and Paul Kurath, all of Waukegan, Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Sep. 23, 1976, Ser. No. 725,829

Int. Cl.² C07D *309/22*

U.S. Cl. 260—345.8 R **2 Claims**

1. 1,2',6'-Tri-N-benzyloxycarbonylfortimicin A.

4,091,033
METHOD OF MAKING 2-ALKOXY-2,3-DIHYDRO-BENZOFURAN-5-OLS AND THEIR ALKYL SULFONIC ACID ESTERS

John Frederick Harris, Meldreth Nr. Royston, England, assignor to Fisons Limited, London, England

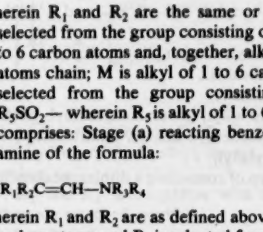
Continuation-in-part of Ser. No. 605,627, Aug. 18, 1975, abandoned. Foreign Application Priority Data Sep. 5, 1974 United Kingdom 38814/74 Sep. 5, 1974 United Kingdom 38815/74 Sep., 1974 United Kingdom 38818/74

This application Jul. 5, 1977, Ser. No. 812,623

Int. Cl.² C07D *307/83*

U.S. Cl. 260—346.22 **9 Claims**

1. A process for preparing a compound of the formula:

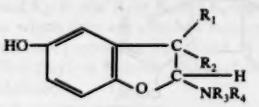


(IV)

wherein R_1 and R_2 are the same or different and each is selected from the group consisting of hydrogen, alkyl of 1 to 6 carbon atoms and, together, alkylene of 2 to 5 carbon atoms chain; M is alkyl of 1 to 6 carbon atoms; and R_6 is selected from the group consisting of hydrogen and R_5SO_2— wherein R_5 is alkyl of 1 to 6 carbon atoms, which comprises: Stage (a) reacting benzoquinone with an enamine of the formula:

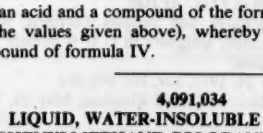
$$R_1R_2C{=}CH{-}NR_3R_4 \qquad \text{(II)}$$

wherein R_1 and R_2 are as defined above, R_3 is alkyl of 1 to 6 carbon atoms and R_4 is selected from the group consisting of alkyl of 1 to 6 carbon atoms and with R_3, together with the N atom, a heterocyclic ring selected from the group of morpholino, piperidino and pyrrolidino in the presence of a compound of the formula R_1R_2CHCHO, whereby there is produced a compound of the formula:



(I)

Stage (b) reacting a compound of formula:



(V)

with an acid and a compound of the formula HOM (where M has the values given above), whereby there is produced a compound of formula IV.

4,091,034
LIQUID, WATER-INSOLUBLE POLYMERIC TRIPHENYLMETHANE COLORANTS AND AQUEOUS DISPERSIONS CONTAINING SAME

Hans Heinrich Kuhn, Spartanburg, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.

Filed Oct. 1, 1976, Ser. No. 728,522

Int. Cl.² C09B *11/12, 11/14*

U.S. Cl. 260—391 **5 Claims**

1. A liquid, water-insoluble blue colorant having the formula R-(oleophilic polymeric constituent)$_n$ wherein R is a triphenylmethane dyestuff radical, the oleophilic polymeric constituent is a polyalkylene oxide and co-polymers of polyalkylene oxides in which the alkylene moiety contains at least 3 carbon atoms, said polyalkylene oxide and co-polymer of polyalkylene oxides having a molecular weight of at least 500, and n is an integer of from 1 to 6.

4,091,035

PROCESS FOR THE PRODUCTION OF HYPOALLERGENIC LANOLIN

Edward Watson Clark, Bradford, England, assignor to Woolcombers Limited, Bradford, England

Filed Jan. 24, 1977, Ser. No. 762,133

Claims priority, application United Kingdom, Feb. 5, 1976, 04503/76

Int. Cl.[2] C07J *9/00*

U.S. Cl. 260—397.25 6 Claims

1. A process for the production of hypoallergenic lanolin wherein lanolin is treated to reduce both the free fatty alcohol content to less than 3.0% and the detergent content to less than 0.05% while otherwise retaining the lanolin esters substantially chemically unchanged.

2. A process for the production of hypoallergenic lanolin as in claim 1 comprising the treatment of lanolin with vacuum at an absolute pressure of 20 to 150 millitorrs and a temperature of 180° C to 240° C.

4,091,036

17-ALKYLTHIO (AND ARYLTHIO)-1',2',3',4'-TETRAHYDROANDROSTENO [16 α, 17 α-B]NAPHTHALENES AND DERIVATIVES

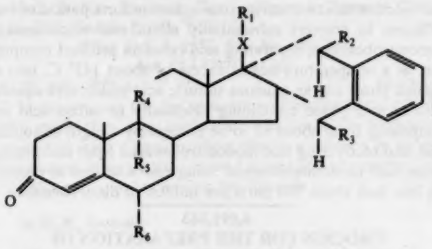
Ravi K. Varma, Belle Mead, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed May 12, 1977, Ser. No. 796,292

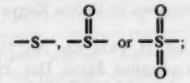
Int. Cl.[2] C07J *1/00*

U.S. Cl. 260—397.45 15 Claims

1. A steroid having the formula



or the 1,2-dehydro derivative thereof, wherein X is



R_1 is alkyl, aryl or acyloxyalkyl; R_2 and R_3 are the same or different and are hydrogen, alkyl, alkoxy, carboalkoxy, formyl,

hydroxy, halogen, phenyl or cyano, with the proviso that when R_2 and R_3 are different, one of R_2 and R_3 is hydrogen; R_4 is carbonyl, β-hydroxymethylene or β-acyloxymethylene; R_5 is hydrogen or halogen; and R_6 is hydrogen or fluorine; wherein the term "aryl" refers to phenyl or phenyl substituted with one or two alkyl, alkoxy or halogen substituents; the term "acyloxy" refers to a group having the formula

wherein Y is alkyl or aryl; and the terms "alkyl" and "alkoxy" refer to groups having 1 to 10 carbon atoms.

4,091,037

PREPARATION OF ALKYLTHIOMETHYLPHENOLS

Hermann Arold, Wuppertal, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

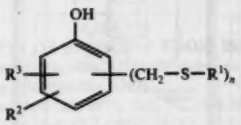
Filed Mar. 31, 1977, Ser. No. 783,370

Claims priority, application Germany, Apr. 6, 1976, 2614875

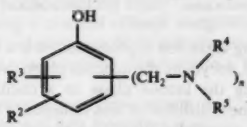
Int. Cl.[2] C07C *149/32, 149/34, 149/36*

U.S. Cl. 260—609 F 9 Claims

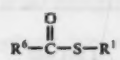
1. A process for the preparation of an alkylthiomethylphenol of the formula



comprising reacting at a temperature of about 70° to 170° C an aminomethylphenol of the formula



with a thiocarboxylic acid S-ester of the formula



in which

R^1 is alkyl with 1 to 12 carbon atoms or alkoxyalkyl with from 1 to 6 carbon atoms in each alkyl moiety, benzyl, phenyl or phenyl carrying at least one C_{1-6} alkyl or halogen substituent,

R^2 and R^3 each independently is hydrogen, alkyl with 1 to 5 carbon atoms, halogen or nitro, or together form a benzene ring or cycloalkane ring with 3 to 5 carbon atoms which is fused to the phenyl ring,

R^4 and R^5 each independently is alkyl with 1 to 6 carbon atoms, or together with the nitrogen atom form a five or six-membered heterocyclic ring,

R_6 is hydrogen or alkyl with 1 to 6 carbon atoms, and n is 1, 2 or 3.

4,091,038

PRODUCTION OF DIHYDROXYDIPHENYL ALKANES

Robert G. Schultz, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Mar. 24, 1977, Ser. No. 780,738

Int. Cl.[2] C07C *29/00*

U.S. Cl. 568—729 11 Claims

1. A process for producing dihydroxydiphenylethanes which comprises reacting phenol with a 1,2-dihaloethane in which the halogen is chlorine, bromine or iodine in at least the stoichiometric proportions of 2:1 in contact with a zinc-containing catalyst at a temperature from about 125° to 225° C and in the presence of iodine as promoter for the reaction.

4,091,039

HYDROLYSIS OF ETHYLENE GLYCOL ACETATES

Edward Scheibel, Media, Pa., assignor to Suntech, Inc., Wayne, Pa.

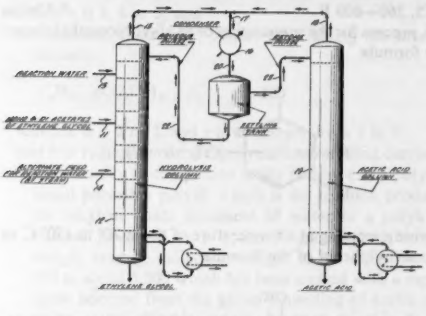
Filed Apr. 26, 1977, Ser. No. 791,118

Int. Cl.[2] C07C *29/00, 27/02, 53/08, 53/22*

U.S. Cl. 568—858 9 Claims

1. In the preparation of an alkylene glycol by hydrolysis of the corresponding aliphatic acid ester, the improvement which

comprises hydrolyzing the ester in a distillation column, taking to a condenser as overhead from the hydrolysis column a vaporous mixture of water and aliphatic acid, which overhead stream is mixed with vapors of a water immiscible aliphatic ketone in the condenser, condensing the mixture and conducting the condensate to a settling tank where an upper ketone



phase containing extracted aliphatic acid and a lower aqueous phase is formed, recycling the aqueous phase to the hydrolysis column, feeding the ketone phase to a distillation column where the ketone is distilled off and returned to the condenser, and separating essentially anhydrous aliphatic acid from the bottom of the distillation column.

4,091,040

PROCEDURE FOR MAKING TRIMETHYLOLMETHANE

Arnold T. Nielsen, China Lake, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 21, 1977, Ser. No. 817,752
Int. Cl.[2] C07C *29/14*
U.S. Cl. 568—853 **1 Claim**

1. A method for producing trimethylolmethane comprising the steps of:

a. reacting diethyl malonate with ethyl orthoformate in the presence of zinc chloride catalyst to produce ethyl ethoxymethylenemalonate;

b. reacting ethyl ethoxymethylenemalonate with sodium ethoxide to produce diethyl diethoxymethylmalonate;

c. reacting diethyl diethoxymethylmalonate with lithium aluminum hydride to produce 3,3-diethoxy-2-(hydroxymethyl)-1-propanol; and

d. forming an aqueous solution of 3,3-diethoxy-2-(hydroxymethyl-1-propanol, adjusting the pH of said solution to 2.5 to produce 2-formyl-1,3-propanediol, and adding hydrogen and ruthenium-charcoal catalyst to produce trimethylolmethane.

4,091,041

PREPARATION OF 1,4-DIOLS BY HYDROLYSIS-HYDROGENATION OF 2-ALKOXYTETRAHYDROFURANS

William Edward Smith, Schenectady, N.Y., assignor to General Electric Company, Pittsfield, Mass.

Filed Jun. 13, 1977, Ser. No. 806,074
Int. Cl.[2] C07C *29/00*
U.S. Cl. 568—865 **20 Claims**

1. A process for the production of butanediol or substituted-butanediols which comprises contacting a 2-alkoxy-tetrahydrofuran or 2-alkoxy-substituted tetrahydrofuran with hydrogen in the presence of water and a hydrolysis-hydrogenation catalyst.

4,091,042

CONTINUOUS ADIABATIC PROCESS FOR THE MONONITRATION OF BENZENE

Verner Alexanderson, Plainfield; James Bryan Trecek, Bridgewater, and Cornelius Marsden Vanderwaart, Basking Ridge, all of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Aug. 19, 1977, Ser. No. 826,208
Int. Cl.[2] C07C *79/10, 79/12*
U.S. Cl. 260—645 **3 Claims**

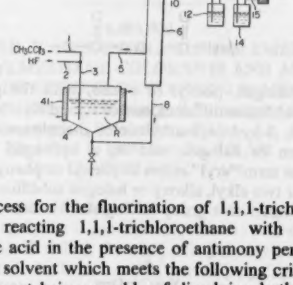
1. In an adiabatic process for the mononitration of benzene with nitric acid to produce mononitrobenzene, whereby a reactant stream of benzene and a reactant stream of a mixed acid comprising nitric acid, sulfuric acid and water are contacted at an elevated temperature to produce a nitration reaction mixture; whereby the heat of mixing and heat of reaction produced thereby is absorbed by said reaction mixture and utilized therein in the nitration reaction; whereby the product of the reaction, consisting of an organic phase containing said mononitrobenzene and an aqueous phase consisting essentially of hot aqueous sulfuric acid are separated; and whereby said organic phase is washed free of acidic by-products to yield said mononitrobenzene, the improvement which comprises: contacting a reactant stream of a stoichiometric excess of benzene and a reactant stream of a mixed acid, comprising from about 3 to 7.5 percent by weight of nitric acid, from about 58.5 to 66.5 percent by weight of sulfuric acid and from about 28 to 37 percent by weight of water, to form a nitration reaction mixture at a temperature in the range of from about 80° C to 120° C under superatmospheric pressure sufficient to maintain said benzene in said reaction mixture in the liquid state; subjecting said reaction mixture to vigorous agitation for a period of time sufficient to convert substantially all of said nitric acid to mononitrobenzene; separating said reaction product composition, at a temperature not in excess of about 145° C, into an organic phase and an aqueous sulfuric acid phase, said aqueous sulfuric acid phase containing essentially no nitric acid and comprising from about 62 to 68 percent by weight of sulfuric acid; and recovering said mononitrobenzene from said organic phase, said mononitrobenzene being characterized as containing less than about 500 parts per million of dinitrobenzene.

4,091,043

PROCESS FOR THE PREPARATION OF 1-CHLORO-1,1-DIFLUOROETHANE AND/OR 1,1,1-TRIFLUOROETHANE

Yohnosuke Ohsaka, Takatsuki, and Osamu Morimoto, Daito, both of Japan, assignors to Daikin Kogyo Co., Ltd., Osaka, Japan

Filed Dec. 21, 1976, Ser. No. 752,926
Claims priority, application Japan, Dec. 29, 1975, 51-157371
Int. Cl.[2] C07C *19/08*
U.S. Cl. 260—653.7 **15 Claims**



1. A process for the fluorination of 1,1,1-trichloroethane comprising reacting 1,1,1-trichloroethane with anhydrous hydrofluoric acid in the presence of antimony pentachloride catalyst in a solvent which meets the following criteria:

a. said solvent being capable of dissolving both antimony pentachloride and 1,1,1-trichloroethane;

b. said solvent having a boiling point of at least 0° C and a melting point not higher than 60° C;

c. said solvent neither reduces antimony pentachloride to a corresponding trivalent antimony compound, nor hydrolyzes antimony pentachloride nor produces a solid complex with antimony pentachloride;
d. said solvent being less reactive with anhydrous hydrofluoric acid than methylchloroform or 1,1-dichloro-1-fluoroethane; and
e. said solvent being non-reactive with methylchloroform.

4,091,044

DEHYDROCOUPLING PROCESS

Tao P. Li, Chesterfield, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Oct. 27, 1976, Ser. No. 735,865
Int. Cl.[2] C07C *15/04*
U.S. Cl. 260—668 C **6 Claims**

1. A process for producing stilbene from toluene which consists of effecting dehydrocoupling of said toluene by contacting it in the vapor phase at a temperature from about 500° to about 650° C with a metal- and oxygen-containing composition of the formula

$$Sb_aPb_bBi_cO_d$$

wherein *a* is 1, *b* is 0.2 to 10, *c* is 0 to 5 and *d* is a number taken to satisfy the average valences of the Sb, Pb, and Bi in the oxidation states in which they exist in said composition.

4,091,045

PROCESS FOR THE PURIFICATION OF LIQUID SORBENTS THAT COMPRISE BIMETALLIC SALT COMPLEXES

David G. Walker, Baytown, Tex., assignor to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Filed Jun. 1, 1977, Ser. No. 802,327
Int. Cl.[2] C07C *11/02*
U.S. Cl. 260—677 A **10 Claims**

1. In the process for the separation of olefins having 2 to 4 carbon atoms from a gas feedstream wherein (a) the feedstream is contacted with a liquid sorbent that is a solution in an aromatic hydrocarbon or halogenated aromatic hydrocarbon of a bimetallic salt complex having the formula

$$M_IM_{II}X_n\cdot\text{Aromatic}$$

wherein M_I is a Group I-B metal, M_{II} is a Group III-A metal, X is halogen, *n* is the sum of the valances of M_I and M_{II}, and Aromatic is a monocyclic aromatic hydrocarbon or halogenated aromatic hydrocarbon having 6 to 12 carbon atoms, thereby forming a reaction mixture that comprises a solution of a complex of the olefin and the bimetallic salt complex in the liquid sorbent, (b) the reaction mixture is separated from the feedstream, (c) the olefin is separated from the liquid sorbent in the reaction mixture, and (d) the liquid sorbent is recycled to Step (a), the improvement that comprises removing from the liquid sorbent impurities that are alkylated aromatic compounds by means of a purification process that comprises the following steps:

(i) dividing the liquid sorbent from which the olefin has been separated in Step (c) into a first portion that comprises 50% to 95% by volume of the liquid sorbent and a second portion that comprises 5% to 50% by volume of the liquid sorbent;
(ii) recycling the first portion of the liquid sorbent to Step (a);
(iii) heating the second portion of the liquid sorbent under atmospheric pressure to a temperature in the range of 80° C. to 135° C., thereby separating a fraction that is rich in aromatic hydrocarbon or halogenated aromatic hydrocarbon from the first residue;
(iv) heating the first residue under a pressure of 10 torr to 100 torr to a temperature in the range of 100° C. to 160° C., thereby separating a fraction that is rich in alkylated aromatic hydrocarbon or alkylated halogenated aromatic hydrocarbon from the second residue;
(v) adding to the second residue an amount of aromatic hydrocarbon or halogenated aromatic hydrocarbon that is substantially equal in volume to the sum of the volume of the fraction rich in aromatic hydrocarbon or halogenated aromatic hydrocarbon that was separated in Step (iii) and the volume of the fraction rich in alkylated aromatic hydrocarbon or alkylated halogenated aromatic hydrocarbon that was separated in Step (iv), thereby forming a reconstituted purified liquid sorbent; and
(vi) recycling the reconstituted purified liquid sorbent to Step (a).

4,091,046

PRODUCTION OF ISOPRENE FROM ISOBUTANE

Rolland E. Dixon, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jun. 28, 1976, Ser. No. 700,686
Int. Cl.[2] C07C *11/12*
U.S. Cl. 260—680 R **5 Claims**

1. A process for producing isoprene comprising
a. introducing isobutane into a cracking zone and cracking isobutane in said cracking zone,
b. withdrawing a cracked effluent comprising isobutylene, propylene and isobutane from said cracking zone,
c. introducing said cracked effluent into a first separation zone,
d. withdrawing a propylene stream and an isobutylene stream from said first separation zone,
e. introducing said propylene stream and said isobutylene stream into a disproportionation zone and disproportionating said streams in said disproportionation zone to form isoamylene,
f. withdrawing an effluent from said disproportionation zone,
g. introducing said disproportionated effluent into a second separation zone,
h. withdrawing an ethylene-comprising stream from said second separation zone,
i. passing said ethylene-comprising stream to a dimerization zone and converting ethylene of said ethylene-comprising stream to butylenes,
j. introducing at least a portion of said butylenes into an isomerization zone in which 1-butylene is isomerized into 2-butylene and wherein at least a portion of the butylenes from said isomerization zone are introduced into said disproportiontion zone,
k. withdrawing an isoamylene-comprising stream from said second separation zone, and
l. dehydrogenating isoamylene from said isoamylene-comprising stream in a first dehydrogenation zone to produce isoprene.

4,091,047

POLYMERIC STABILIZERS FOR POLYVINYL CHLORIDE RESIN

Joseph Serratore, and William L. Clayton, both of Sarnia, Canada, assignors to Exxon Research & Engineering Co., Linden, N.J.

Division of Ser. No. 585,485, Jun. 10, 1975, Pat. No. 4,032,594. This application Apr. 11, 1977, Ser. No. 786,575
Int. Cl.[2] C08L *63/00*
U.S. Cl. 260—836 **1 Claim**

1. A method for preparing a polyvinyl chloride composition which comprises blending with polyvinyl chloride resin about 1 to about 50 parts based on 100 parts of resin of a copolymer of polypropylene having grafted thereon a saturated epoxy monomer selected from the group consisting of glycidyl methacrylate, glycidyl acrylate, allyl glycidyl ether, vinyl glycidyl phthalate and allyl glycidyl phthalate, wherein said composition has improved thermal stability and a glass transition temperature equal to or greater than the glass transition temperature of the polyvinyl chloride resin.

4,091,048

POWDER COATING COMPOSITIONS CONTAINING GLYCIDYL ESTER COPOLYMERS AND ORGANIC CARBOXYLIC ACID ANHYDRIDE CROSSLINKING AGENT

Santokh S. Labana, Dearborn Heights, and Ares N. Theodore, Farmington, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Continuation-in-part of Ser. No. 172,224, Aug. 16, 1971, Pat. No. 3,781,379. This application Dec. 18, 1973, Ser. No. 425,743 The portion of the term of this patent subsequent to Dec. 25, 1990, has been disclaimed.

Int. Cl.² C08L *63/00*

U.S. Cl. 260—836 **18 Claims**

1. A powder coating composition which, exclusive of pigments and other nonreactive components, comprises a coreactable mixture of: (A) a copolymer of about 5 to about 20 weight percent of a glycidyl ester of a monoethylenically unsaturated acid and about 95 to about 80 weight percent of other monoethylenically unsaturated monomers, said copolymer having a glass transition temperature in the range of 40° C to 90° C and a molecular weight ($\overline{M}_n$) in the range of 2500 to 8500; and (B) an organic carboxylic acid anhydride crosslinking agent in the amount of between about 0.4 and about 1.0 anhydride groups for each epoxy group in the copolymer.

4,091,049

POWDER COATING COMPOSITIONS CONTAINING GLYCIDYL ESTER COPOLYMERS AND CARBOXYL TERMINATED CROSSLINKING AGENT

Santokh S. Labana, Dearborn Heights, and Yun-Feng Chang, Plymouth, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Continuation-in-part of Ser. No. 172,229, Aug. 16, 1971, Pat. No. 3,781,380. This application Dec. 18, 1973, Ser. No. 425,745 The portion of the term of this patent subsequent to Dec. 25, 1990, has been disclaimed.

Int. Cl.² C08L *63/00*

U.S. Cl. 260—836 **22 Claims**

1. A powder coating composition which, exclusive of pigments and other non-reactive components, comprises a coreactable mixture of:

(A) a copolymer of about 8 to about 30 weight percent of a glycidyl ester of a monoethylenically unsaturated acid and about 92 to about 70 weight percent of other monoethylenically unsaturated monomers, said copolymer having a glass transition temperature in the range of 40° C to 90° C and a molecular weight ($\overline{M}_n$) in the range of 2500 to 8500; and

(B) a carboxyl terminated crosslinking agent in an amount ranging from about 0.8 to about 1.2 carboxyl groups for each epoxy group in the copolymer.

4,091,050

METHOD FOR THE PREPARATION OF MIXTURES OF (METH)ACRYLIC TERMINATED POLYETHER RESIN AND 3-HALO-2-HYDROXYPROPYL (METH)ACRYLATE

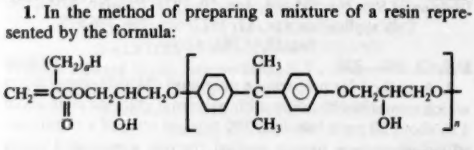
William H. McDonald, Arnold, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jan. 27, 1976, Ser. No. 652,686

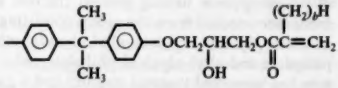
Int. Cl.² C08L *63/00*

U.S. Cl. 260—837 R **15 Claims**

1. In the method of preparing a mixture of a resin represented by the formula:



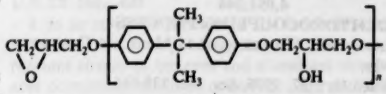
and a reactive solvent represented by the formula:

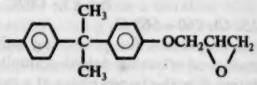


wherein

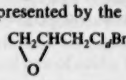
(a) said reactive solvent constitutes from about 5 percent to about 95 percent by weight of said mixture;

(b) diglycidyl ether of bisphenol A represented by the formula:





and epihalohydrin represented by the formula:



are reacted with ethylenically unsaturated monocarboxylic acid which is acrylic acid, methacrylic acid or mixtures of acrylic acid and methacrylic acid;

(c) the average value of n is in the range of from 0 to 3;

(d) the average values of a, b and c are each independently in the range of from 0 to 1;

(e) the average value of d is in the range of from 0 to 1;

(f) the average value of e is in the range of from 0 to 1;

(g) $d + e = 1$;

(h) the average value of f is in the range of from 0 to 1;

(i) the average value of g is in the range of from 0 to 1; and

(j) $f + g = 1$

the improvement comprising adding said diglycidyl ether of bisphenol A and said epihalohydrin to said ethylenically unsaturated monocarboxylic acid while the weight of said reactive solvent in the reaction mixture is at least about 5 percent of the sum of the weights of said resin and said reactive solvent present in said reaction mixture.

4,091,051

BLOCK COPOLYMERS OF ALKADIENES AND MONOVINYL ARENES

George A. Moczygemba, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 20, 1978, Ser. No. 633,883

Int. Cl.² C08F *297/04*

U.S. Cl. 260—880 B **4 Claims**

1. A copolymer having the structure hydrogenated low vinyl poly-1,3-butadiene block/hydrogenated medium vinyl poly-1,3-butadiene block/poly(monovinyl arene) block wherein said low vinyl poly-1,3-butadiene contains 6–12 mol % vinyl based on the total butadiene is the low vinyl poly-1,3-butadiene block, and wherein said medium vinyl poly-1,3-butadiene block contains 25–75 mol % of vinyl based on the total butadiene content of said medium vinyl poly-1,3-butadiene block.

4,091,052

COATING COMPOSITION

Hideo Horii; Yutaka Otsuki, both of Yokohama; Atsushi Kaiya, and Yoshihiko Araki, both of Kawasaki, all of Japan, assignors to Nippon Oil Company Limited, Tokyo, Japan

Filed Jun. 1, 1976, Ser. No. 691,969

Claims priority, application Japan, Jun. 5, 1975, 50-67087; Jun. 5, 1975, 50-67088

Int. Cl.² C08F *279/02*

U.S. Cl. 260—879 **10 Claims**

1. A coating composition comprising in combination:

(a) the reaction product of a butadiene polymer having a

number average molecular weight of 500 - 10,000, more than 50% of the butadiene units in the polymer chain being linked in 1,2-bonds, and 0.02 - 0.3 mol of an unsaturated dicarboxylic acid or its anhydride per 100 grams of said polymer;

(b) a poly-(metha)-acrylate of a polyhydric alcohol added in amounts of 5 - 100 weight parts per 100 weight parts of said component (a);

(c) at least one compound of the class consisting of compounds having an allyl ether group, compounds having a tetrahydrofurfuryl group and compounds having a benzyl ether group, said compound being added in amounts of 1 - 50 weight parts per 100 weight parts of said component (a); and

a radical generator added in amounts of 0.1 - 15 weight parts per 100 weight parts of said component (a).

4,091,053
COUPLED RESINOUS DIENE COPOLYMER WITH GOOD INTEGRAL HINGE FLEX LIFE AND HIGH HARDNESS

Alonzo G. Kitchen, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jun. 24, 1976, Ser. No. 699,731
Int. Cl.² C08F *297/04*
U.S. Cl. 260—880 B **15 Claims**

1. A coupled resinous block copolymer of a monovinyl-substituted aromatic compound and a conjugated diene, said copolymer having 71 to 81 weight percent polymerized monovinyl-substituted aromatic compound, wherein chains forming said copolymer prior to coupling comprise a high molecular weight portion and a low molecular weight portion, a ratio of calculated number average molecular weight of polymerized monovinyl-substituted aromatic compound blocks of said high molecular weight portion to polymerized monovinyl-substituted aromatic compound blocks of said low molecular weight portion being in the range of 3 to 7, said copolymer being produced by adding monovinyl-substituted aromatic compound monomer in first and second portions, a weight ratio of said monovinyl-substituted aromatic compound in said first portion to that in said second portion being within the range of 1:1.5 to 2:1, with 2.0 to 2.7 millimoles of initiator per mole of monomer in said first portion being introduced with said first portion and 3 to 5 millimoles of initiator per mole of monomer in said second portion being introduced with said second portion.

4,091,054
PROCESS OF PREPARING STYRENIC POLYMER PARTICLES

Fumio Saito, Tsurunosato Ohtsu; Fumito Yamai, Kusatsu; Yositugu Beppu, Shiga, and Shinpei Nakayama, Kusatsu, all of Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka and Sekisui Kaseihin Kogyo Kabushiki Kaisha, Nara, both of, Japan

Continuation-in-part of Ser. No. 381,459, Jul. 23, 1973, abandoned. This application Jul. 17, 1975, Ser. No. 596,785
Int. Cl.² C08F *257/02, 212/10, 2/26, 2/30*
U.S. Cl. 260—886 **11 Claims**

1. In a suspension polymerization process for preparing styrenic polymer particles from a styrenic monomer and styrenic polymer particles having particle sizes in a definite particle size range which comprises suspending the styrenic polymer particles in water containing a surface active agent and a suspending agent selected from the group consisting of a water-soluble high molecular weight material and a slightly soluble inorganic material and adding to the aqueous suspension the styrenic monomer and a suspension polymerization catalyst to cause the polymerization, the improvement which comprises reducing the amount of powdery polymer particles which pass through a 32 mesh sieve to thereby obtain said styrenic polymer particles having a uniform particle size by adding:

(1) a polymerization catalyst suspension prepared from a polymerization catalyst solution comprising (a) 100 to 60% by weight of the suspension polymerization catalyst selected from the group consisting of organic peroxides, azo compounds and mixtures thereof and (b) 1 to 10% by weight of styrene monomer with up to 50% by weight of a different monomer copolymerizable therewith selected from the group consisting of methylacrylate, ethylacrylate, butylacrylate, methylmethacrylate, ethylmethacrylate, dimethylmaleate, diethylmaleate, acrylonitrile, α-methylstyrene, divinylbenzene and a mixture thereof having been admixed with an aqueous solution containing an emulsifying agent or a suspending agent to form a finely suspended polymerization catalyst suspension; and

(2) a monomer solution comprising (a') 0 to 40% by weight of the suspension polymerization catalyst and (b') 99 to 90% by weight of styrene monomer with up to 50% by weight of a different monomer copolymerizable therewith, dropwise and simultaneous but separately from each other to the aqueous suspension of the polymer particles selected from the group consisting of styrene homopolymer and a copolymer of styrene monomer and up to 50% by weight of a different monomer copolymerizable therewith selected from the group consisting of an acrylic ester, a methacrylic ester, a maleic ester and a fumaric ester wherein the alcohol moiety is an alkyl group having 1 to 12 carbon atoms, to cause the polymerization; the amount of said styrene monomer and styrene homopolymer or copolymer being 95 to 40% by weight and 5 to 60% by weight, respectively, based on the total amount thereof; and the particle size of said styrene homopolymer or copolymer being about 02. to 1.8 mm.

4,091,055
LIGHT TRANSMITTING POLYVINYLIDENE FLUORIDE OR VINYLIDENE FLUORIDE COPOLYMER COMPOSITIONS

Kunizoh Kidoh; Yoshio Kudo, and Fujio Suzuki, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 19, 1976, Ser. No. 687,763
Claims priority, application Japan, May 23, 1975, 50-61571
Int. Cl.² C08L *27/16*
U.S. Cl. 260—900 **4 Claims**

1. A composition consisting essentially of (1) 50-99% by weight of polyvinylidene fluoride or a vinylidene fluoride copolymer and (2) 1-50% by weight of a copolymer of 6 to 60 percent by weight of a vinyl fluoride monomer and 94 to 40 percent be weight of at least one acrylate monomer selected from the group consisting of alkyl acrylates and alkyl methacrylates wherein the alkyl group contains from one to four carbon atoms.

4,091,056
METHOD OF VAPORIZING LIQUIDS

Veikko Hamalainen, Vaahtorinne 3 C 38, 01600 Myyrmaki, 00910 Helsinki, and Jaakko Aarnio, Haarniskatie 6 B 13, 00910 Helsinki, both of Finland

Division of Ser. No. 372,623, Jun. 22, 1973, Pat. No. 3,941,861. This application Apr. 15, 1975, Ser. No. 568,153
Claims priority, application Finland, Jun. 28, 1972, 721827; Sep. 11, 1972, 722494; Feb. 22, 1973, 73545
Int. Cl.² B01F *3/04*
U.S. Cl. 261—19 **2 Claims**

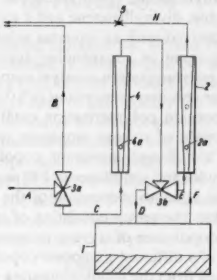
1. A method for delivering a controlled and predetermined amount of vapors of a vaporizable liquid to a destination for use there which comprises:

(a) providing a stream of carrier gas;

(b) dividing said stream into two substreams;

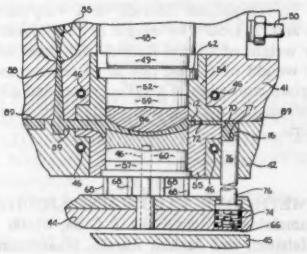
(c) directing a first of said substreams to a suction zone;

(d) passing the second of said substreams through a first gasflow metering zone to produce a metered substream of carrier gas;
(e) further dividing said metered substream of carrier gas into two portions of predetermined and controllably variable amounts;
(f) directing a first of said portions to a second gas-flow metering zone;
(g) passing the second of said portions through a body of vaporizable liquid to vaporize said liquid and produce a first mixed stream of vapor and carrier gas while regulating the relative amounts of carrier gas in said first and second portions to obtain the desired amount of vapor in said mixed stream;



(h) passing said first mixed stream of vapor and carrier gas through said second gas-flow metering zone to produce a second mixed stream comprising vapor and said first and second portions of carrier gas;
(i) passing said second mixed stream of vapor and carrier gas through said suction zone; and
(j) passing said second mixed stream of vapor and carrier gas from said suction zone to said destination for use.

4,091,057
METHOD FOR INJECTION MOLDING LENSES
Hermann P. Weber, 5506 Beckford Ave., Tarzana, Calif. 91356
Division of Ser. No. 606,774, Aug. 22, 1975, Pat. No. 4,008,031.
This application Sep. 1, 1976, Ser. No. 719,356
Int. Cl.[2] B29D *11/00*
U.S. Cl. 264—1 **8 Claims**

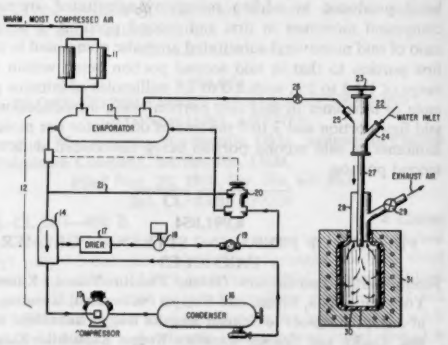


1. A method for forming a thermoplastic optical lens blank in an injection molding apparatus where said apparatus includes an optical cavity for defining said optical lens blank comprising the steps of:
injection molten plastic into said cavity at a first aperture along the edge of said cavity when said cavity has a volume greater than said optical lens said greater volume to assure better flow into the thinner section of said cavity; and
compressing said cavity such that the thickness of said cavity is decreased so as to define said optical lens blank, thereby causing an flow of molten plastic from said optical cavity at a second aperture along said edge of said cavity, said second aperture spaced-apart from said first aperture;
whereby said injected molten plastic flows into a cavity having a greater thickness than the thickness of said optical lens blank, thereby avoiding problems associated with conventional plastic flow into a thin cavity.

4,091,058
MANUFACTURE OF FIBRIDS FROM POLY(AMIDE-IMIDE) RESINS
Bruno Sander, Ludwigshafen; Kurt Scherling, Hemsbach; Rolf Steinberger, Schifferstadt, and Eckhard Ropte, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen am Rhine, Germany
Filed Sep. 28, 1976, Ser. No. 727,585
Claims priority, application Germany, Oct. 1, 1975, 2543824
Int. Cl.[2] B01J *2/06*
U.S. Cl. 264—11 **7 Claims**

1. A process for the manufacture of fibrids by dissolving a poly(amide-imide) resin in an organic solvent and introducing the resulting solution into water while at the same time exposing it to shearing forces, in which process the solution of the poly(amide-imide) resin in an organic solvent is mixed, before its introduction into water, with a liquid in a volume ratio of said solvent to said liquid of from 1:1.5 to 1:5, said liquid being a non-solvent for the poly(amide-imide) resin but being homogeneously miscible in all proportions with water and with the organic solvent, and which liquid is selected from the group consisting of tetrahydrofurane and 1,4 dioxane.

4,091,059
METHOD FOR BLOW MOLDING AND COOLING PLASTIC ARTICLES
Leonard Benoit Ryder, 5 Sharon Dr., Whippany, N.J. 07981
Filed Sep. 23, 1976, Ser. No. 725,693
Int. Cl.[2] B29C *17/07, 25/00*
U.S. Cl. 264—28 **7 Claims**

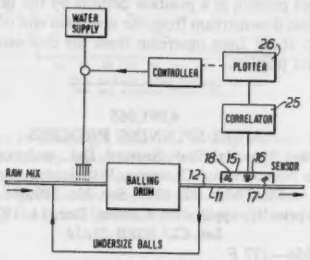


1. A process for the preparation of a blow molded article which comprises the steps of shaping a thermoplastic polymer material in a mold cavity with a pressurized gaseous blowing medium to form a hollow shaped article and cooling the article, the improvement which comprises effecting said cooling by
(a) introducing air having a temperature ranging from 75°–105° F and maintained at a pressure ranging from 80–400 psig at a dew point of about 75° F to a pressure swing dessicant bed type dryer, so resulting in drying of said air to a dew point of the order of −60° F,
(b) passing the resultant dried air to a chiller wherein it is cooled to a temperature ranging from −30° to −50 ° F, and
(c) introducing said chilled air into and continually flushing it through the blow molded article.

4,091,060
BALLING PROCESS

George A. Carter, Stokesley, and Reginald S. Young, Uxbridge, both of England, assignors to British Steel Corporation, London, England

Filed Jul. 19, 1976, Ser. No. 706,593
Claims priority, application United Kingdom, Jul. 29, 1975, 31730/75
Int. Cl.[2] B01J 2/12
U.S. Cl. 264—40.1 18 Claims

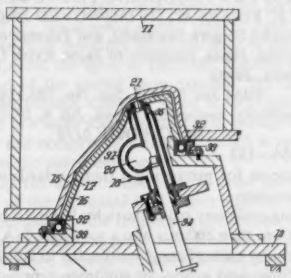


1. A process for continuously forming balls from communited solids, comprising:
(a) adding a controlled amount of liquid to a moving mass of communited solids,
(b) feeding said wetted solids into a moving balling device wherein said solids are formed into balls having a surface liquid content,
(c) removing said formed balls from said balling device,
(d) determining the surface liquid content of said balls by projecting upon said balls an incident light beam, and measuring the intensity of the light beam reflected from said balls in a pre-selected direction, and
(e) controlling the amount of liquid added in step (a) in response to the determined surface liquid content of the balls as in step (d).

4,091,061
METHOD FOR THE PRODUCTION OF MOULDINGS CONTAINING REINFORCING FIBRE TYPE FILLER

Paul Turbier, Plaisir, and Laszlo Szekely, Bruyeres-le-Chatel, both of France, assignors to Engins Matra, Paris, France

Continuation of Ser. No. 592,940, Jul. 3, 1975, abandoned. This application May 25, 1977, Ser. No. 800,314
Claims priority, application France, Jul. 5, 1974, 74 23519
Int. Cl.[2] B29G 3/00
U.S. Cl. 264—40.5 6 Claims

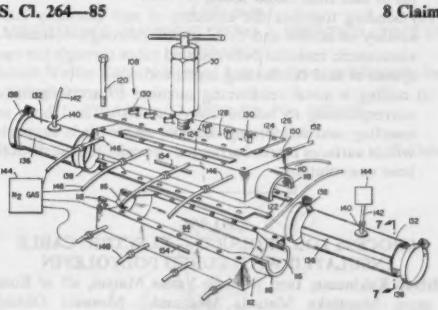


1. A method for producing mouldings from a thermosetting binder material and a fibrous type filling, comprising the steps of:
locating said filler in the stationary part of a multi-part moulding machine comprising said stationary part and a movable part while the movable part is in a first, fully open position in which it is spaced apart from the stationary part by a maximum amount,
heating said mould,
moving said movable part at a higher speed from said first position to an intermediate position, and a lower speed to a second position in which said parts limit a moulding cavity of minimum volume, corresponding in shape to the moulding to be produced,
injecting a first fraction of between 60% and 80% said thermosetting binder material under a lower pressure while the movable part is being moved from said intermediate position to said second position and limits an open cavity,
an injecting a second fraction of said thermosetting binder material sufficient to completely fill said cavity of minimum volume under a higher pressure while the movable part is retained in said second position.

4,091,062
CABLE MOLDING METHOD

Arthur L. Nelson, La Jolla, Calif., assignor to Townsend & Townsend, trustee, San Francisco, Calif.

Continuation-in-part of Ser. No. 388,263, Aug. 14, 1973, abandoned, which is a continuation-in-part of Ser. No. 274,823, Jul. 24, 1972, abandoned, and a continuation-in-part of Ser. No. 119,150, Feb. 26, 1971, abandoned. This application Jan. 15, 1975, Ser. No. 541,298
Int. Cl.[2] B29C 6/00
U.S. Cl. 264—85 8 Claims



1. A method for insulating high voltage cable comprising the steps of placing a layer of a moldable insulating material about a conductive core of the cable, which moldable material shrinks during cooling, placing the core with the layer of material in a mold, heating the layer while it is in the mold and at the same time subjecting the layer to superatmospheric pressure so that the layer conforms to the mold, thereafter cooling the layer of insulating material to about room temperature, and during said cooling step subjecting said layer to a gaseous medium at superatmospheric pressure until such layer is sufficiently cooled to prevent the formation of voids in the insulation due to shrinkage of the layer during said cooling.

4,091,063
HOSE CONSTRUCTION AND METHOD OF MAKING SAME

Arthur D. Logan, Waynesville, N.C., assignor to Dayco Corporation, Dayton, Ohio

Division of Ser. No. 487,510, Jul. 11, 1974, abandoned. This application Mar. 12, 1975, Ser. No. 557,730
Int. Cl.[2] B29H 7/14
U.S. Cl. 264—94 6 Claims

1. A method for making a flexible hose having axially spaced convolutions defining alternating crests and troughs, comprising the steps of:
(a) forming a base tube of elastomeric material;
(b) knitting single reinforcing layer of 2200 denier rayon

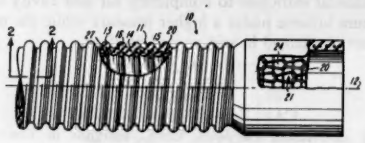
filament in a knitted lockstitch of 8–9 courses per inch around said base tube, said layer having open spaces therein;

(c) applying a cover tube of elastomeric material free of adhesive means concentrically around said layer and base tube to define a tubular assembly;

(d) subjecting said assembly to semi-curing conditions to provide a semi-cure of said base and outer tubes;

(e) placing said semi-cured assembly within a mold having axially spaced convoluted walls;

(f) final forming and final curing said semi-cured assembly within said mold by urging said assembly against said wall in a controlled environment to form axially sapced convolutions in said hose having crests and troughs of roughly



uniform wall thickness such that the thickness at said crests is no more than 25% greater than the thickness at said troughs;

(g) the 100% modulus of said semi-cured elastomeric material being roughly fifty percent less than the 100% modulus of said final cured tubes;

(h) bonding together the elements of said assembly into a unitary structure and causing strikethrough columns of elastomeric material between said tubes through the open spaces of said reinforcing layer; and

(i) coiling a metal reinforcing member to a configuration corresponding to helical convolutions of said hose and inserting said reinforcing member so that it is supported within surfaces thereof arranged opposite the crests of the hose convolutions.

4,091,064

PROCESS FOR PRODUCING ELECTRIC CABLE INSULATED WITH CURED POLYOLEFIN

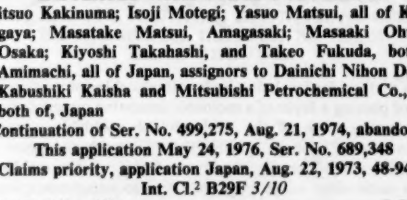
Mitsuo Kakinuma; Isoji Motegi; Yasuo Matsui, all of Kumagaya; Masatake Matsui, Amagasaki; Masaaki Ohtsuju, Osaka; Kiyoshi Takahashi, and Takeo Fukuda, both of Amimachi, all of Japan, assignors to Dainichi Nihon Densen Kabushiki Kaisha and Mitsubishi Petrochemical Co., Ltd, both of, Japan

Continuation of Ser. No. 499,275, Aug. 21, 1974, abandoned. This application May 24, 1976, Ser. No. 689,348

Claims priority, application Japan, Aug. 22, 1973, 48-94059

Int. Cl.² B29F *3/10*

U.S. Cl. 264—174 **3 Claims**



1. In a process for producing large-sized thickwalled insulating electric cable including cable of ultra-high voltage rating of 154KV to 275KV comprising the steps of feeding an electric conductor continuously through an extruder head and a long land die having a length of from about 1 meter to 50 meters or more coupled thereto on the downstream side of the extruder head, extruding a polyolefin composition containing a curing agent onto the electric conductor with a liquid forming coagent having a viscosity of 0.5 to 3000 centistokes at 235° C., said forming coagent being simultaneously introduced onto the inner surface of the die, hot-curing the polyolefin layer thus formed on the conductor in the die, and cooling the polyolefin layer thus cured with pressurized cooling fluid, the improvement wherein said forming coagent is applied to the outer surface of the polyolefin layer by continuously supplying the coagent into a converging tapered portion provided in said die on the downstream side of said extruder head and on the upstream side of the long land portion of the die having a constant inner diameter, and the forming coagent being supplied to the tapered portion at a position defined by the range of from about 10mm downstream from the upstream end of the tapered portion to about 2mm upstream from the downstream end of the tapered portion.

4,091,065

MELT SPINNING PROCESS

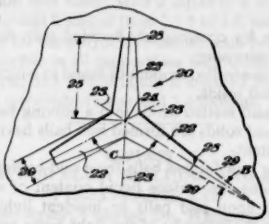
Chandrakant Shantilal Shah, Seaford, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 22, 1977, Ser. No. 780,084

Claims priority, application Canada, Dec. 14, 1976, 267782

Int. Cl.² B28B *21/54*

U.S. Cl. 264—177 F **5 Claims**



1. In a process for cospinning at least two synthetic trilobal filaments from the same polymer melt wherein one filament has a modification ratio no greater than 1.9 and the other filament has a modification ratio greater than 1.9 and the two filaments differ in their modification ratios by at least 0.3, the improvement comprising spinning the filament of lower modification ratio through a spinneret orifice configured as three radially intersecting tapered slots and spinning said other filament through a spinneret orifice configured as three radially intersecting reverse-tapered slots.

4,091,066

PROCESS FOR PRODUCING FLAME RETARDANT ACRYLIC FIBERS WITH IMPROVED PROPERTIES

Hiroshi Suzuki; Shigeru Sawanishi, and Takamaro Kusunose, all of Okayama, Japan, assignors to Japan Exlan Company Limited, Osaka, Japan

Filed Jul. 6, 1976, Ser. No. 703,114

Claims priority, application Japan, Jul. 4, 1976, 51-83039

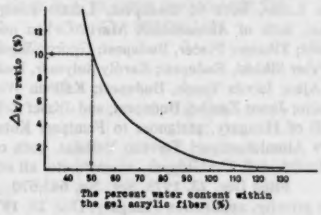
Int. Cl.² D01F *6/18*

U.S. Cl. 264—182 **5 Claims**

1. A process for producing a flame retardant acrylic fiber which comprises

dispersing antimony oxide particles having a particle diameter of less than 100 mμ into a solution of (A) a copolymer containing units of acrylonitrile, 0.3 to 0.3% by weight of a sulfonic acid group- or sulfonate group-containing unsaturated monomer and a halogen-containing unsaturated monomer or (B) a composition containing a halogen-containing flame retardant component and a copolymer containing units of acrylonitrile and 0.3 to 0.7% by weight of a sulfonic acid group- or sulfonate group-containing unsaturated monomer, to prepare a spinning solution having a concentration of said copolymer (A) or said composition (B) of 8 to 13% by weight,

wet-spinning the spinning solution into a coagulation bath having a temperature of −3° to 10° C to obtain filaments, cold-stretching the filaments at a ratio of 1.5 to 3.0 times, hot-stretching the cold stretched filaments at a ratio of 1.5 to



10 times to obtain gel filaments having a water content of 50 to 130% by weight based on the weight of the fiber-forming polymer components,

drying the gel filaments to compact the filaments, and subjecting the dried filaments to a heat-relaxing treatment.

4,091,067

PROCESS FOR PRODUCING AN AURAL COMMUNICATIONS RECEIVING DEVICE

Harold L. Kramer, Schenectady, and Frederick M. Lewis, Burnt Hills, both of N.Y., assignors to Marion Health & Safety, Inc., Rockford, Ill.

Division of Ser. No. 254,072, May 17, 1972, abandoned. This application Jul. 25, 1973, Ser. No. 382,513

Int. Cl.² B29D *3/02, 31/00*

U.S. Cl. 264—222 **2 Claims**

1. A process for producing a formed-in-place communications receiver for the human ear, said process comprising the steps of:

(a) wrapping longitudinally around a small diameter coring form a disc of a composition which comprises a non-irritating curable synthetic elastomer having a stiff putty-like consistency, molding said composition on said coring form and into the shape of a blunt tapered cone, the coring form extending inwardly from the base of the cone to a point adjacent the apex of the cone, leaving at least the outer end of the coring form exposed, the coring form having an outside diameter sized to correspond to the diameter of a small sound transmitting passageway in said receiver and comprising a material which is easily releasable from the cured elastomer;

(b) inserting the apex of the tapered cone into the outer opening of the ear canal to a depth slightly beyond the cartilage regions of the tragus and the eminentia conchae, firmly packing the composition around the ear canal opening to produce a receiver body having a protuberance which extends into and conforms to the outer opening of the ear canal, and leaving a part of the receiver body outside of the ear canal opening and the coring form centrally located within the receiver body and the ear canal;

(c) molding the external portion of the receiver body into an ear shell conforming surface and adding an additional amount of said composition to provide a mass at least sufficient to moldably engage with the outer ear and provide means for assisting in the retention of the receiver in the ear;

(d) engaging the outer, exposed end of said coring form with an aperture in a combination comprising (1) a finishing plate and (2) an apertured communications component or an apertured means for connecting a communications component to said receiver body, pushing said combination down the coring form and into engagement with the receiver body using sufficient force to embed the communications component or connecting means into the composition and to cause the inner surface of the finishing plate to press the composition into a substantially flat surface at the area of contact with the plate, said communications component or connecting means comprising a material which is bondable to the elastomer, and said finishing plate comprising a material which is easily releasable from the elastomer;

(e) allowing the elastomer to cure to a permanent shape; and

(f) removing the finishing plate and the coring form from the communications receiver so produced.

4,091,068

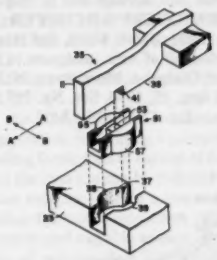
METHOD OF IMMOBILIZING A PRINTED CIRCUIT BOARD

Joseph Walter Karas, Phoenix, Ariz., assignor to Motorola Inc., Schaumburg, Ill.

Filed May 13, 1976, Ser. No. 685,848

Int. Cl.² B29B *1/14, 3/02*

U.S. Cl. 264—274 **3 Claims**



1. A method of immobilizing a pluggable board when the board is plugged into a connector and a keeper mounted on a supporting base, said method comprising the steps of:

providing a channel in the keeper for receiving an edge of the pluggable board, the channel having a recess with a wider cross-section intermediate the channel;

providing a notch in the edge of the pluggable board situated so as to be generally within the channel in the keeper with the pluggable board properly inserted in the connector and keeper;

placing a soft moldable and hardenable material into the channel of the keeper;

inserting an edge portion of the board with the notch into the channel;

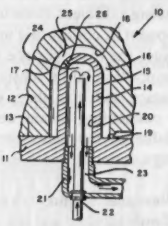
pressing the board against the keeper so that the moldable and hardenable material is squeezed out and pressed to form fit and fill the gap between the notch of the circuit board and the support; and

hardening said moldable material so that when it hardens it prevents any movement of the board relative to the supporting base.

4,091,069
METHOD AND APPARATUS FOR VENTING ENTRAPPED AIR IN MOLD CAVITIES

Paul E. Allen, Newtown, Conn., assignor to Logic Devices, Inc., Sandy Hook, Conn.

Filed Feb. 17, 1977, Ser. No. 769,488
Int. Cl.[2] B29F *1/00*
U.S. Cl. 264—328 6 Claims

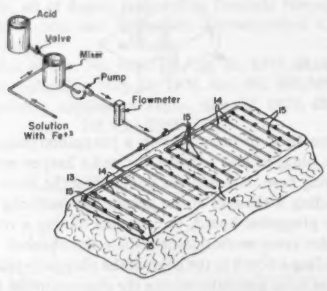


1. The method of molding a plastic article comprising the steps of providing a mold die having a closed cavity shaped substantially like the article and having an inlet to said cavity, injecting liquid plastic material into the cavity through said inlet in a manner which causes entrappment of the air present in the cavity to be concentrated in an area of the cavity, flowing liquid coolant through the mold adjacent the cavity, venting the area of the cavity having the entrapped air to the liquid coolant and maintaining the pressure of the flowing coolant at least where the entrapped air is vented at a pressure that is less than atmospheric pressure.

4,091,070
RECOVERY OF COPPER

William F. Riggs, Globe; Jaime Veloz, and Harry R. Dahlberg, both of Inspiration, all of Ariz., assignors to Inspiration Consolidated Copper Company, Morristown, N.J.

Filed Aug. 25, 1976, Ser. No. 717,500
Int. Cl.[2] C22B *15/08*
U.S. Cl. 423—41 18 Claims



1. A method of treating a copper ore containing sulfidic copper minerals which comprises forming the ore into a dump leach heap of a depth of at least about ten feet, substantially saturating the ore in such heap with an aqueous strong acid solution containing 100 to 400 g/l H_2SO_4 and 5 to 50 g/l ferric ion, maintaining the ore in the heap thus saturated in contact with such strong acid solution for a curing period of at least 2 days, thereafter washing the cured heap by percolating therethrough a weak acid wash solution containing up to 50 g/l H_2SO_4 and 5 to 50 g/l ferric ion, and collecting such wash solution pregnant with dissolved copper after it has passed through the cured heap.

4,091,071
PROCESS FOR DIGESTING GOETHITE-CONTAINING BAUXITES ACCORDING TO THE BAYER TECHNOLOGY

Jozsef Bóros, Ajka; Tibor Ferenczi, Tatabanya; Gyula Horváth; Ferenc Lazar, both of Budapest; László Lengyel; József Mátyasi, both of Almasfuzito; Maria Orbán née Kelemen, Budapest; Tihamer Pintér, Budapest; György Sigmond, Budapest; Péter Siklósi, Budapest; Károly Solymár, Budapest; Béla Tóth, Ajka; István Vorós, Budapest; Kálman Wentzely, Almasfuzito; Janos Zambo, Budapest, and József Zöldi, Tatabanya, all of Hungary, assignors to Femipari Kutato Intezet; Aluterv Aluminiumipari Tervezo Vallalat, both of Budapest and Almásfuzitói Timföldgyár, Almasfuzito, all of, Hungary

Filed Dec. 23, 1975, Ser. No. 643,670
Claims priority, application Hungary, Dec. 24, 1974, AU 330
Int. Cl.[2] C01F *7/06*
U.S. Cl. 423—121 1 Claim

1. In a process for digesting goethite-containing bauxites according to the Bayer technology, for accelerating the digesting process, for transforming the goethite into hematite, for increasing the Al_2O_3-yield and for reducing the caustic soda losses, at a temperature of 180°–300° C, using aluminate liquor of a concentration of 80–300 g/l Na_2O_c, the improvement comprising carrying out the digestion in the presence of added amounts of 2–6% calcium oxide and 0.2–2.0% Mn^{++} ions reckoned upon the weight of the dry bauxite.

4,091,072
EXHAUST GAS CONVERSION PROCESS AND CATALYST

Dennis P. McArthur, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Continuation-in-part of Ser. No. 706,684, Jun. 19, 1976. This application Mar. 7, 1977, Ser. No. 774,595
Int. Cl.[2] B01D *53/34*
U.S. Cl. 423—213.5 14 Claims

1. A method for the conversion of nitrogen oxides, carbon monoxide and hydrocarbons in near stoichiometric engine exhaust gases which comprises passing said exhaust gases under conversion conditions through a two-catalyst system to which no air is admitted downstream from the inlet thereto, said system comprising two contiguous catalytic components, A and B, segregated in separate longitudinal zones of said system, component A comprising a porous, inert support having dispersed thereon 1–20 weight % of nickel and/or cobalt and a smaller proportion of rhodium, and being essentially free of platinum and palladium, component B comprising a porous inert support having dispersed thereon a minor proportion of platinum and/or palladium and being essentially free of rhodium.

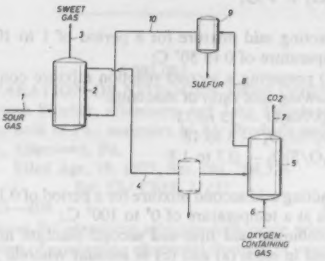
10. An exhaust gas conversion catalyst comprising a ceramic monolith having a honeycomb structure, the interior channels of one end of said monolith being coated with a catalyst component A, and the interior channels of the opposite end of said monolith being coated with a separate catalyst component B, and wherein component A comprises a porous inert support having dispersed thereon 1–20 weight % of nickel and/or cobalt and a smaller proportion of rhodium, and being essentially free of platinum and palladium, and component B comprises a porous inert support having dispersed thereon a minor proportion of platinum and/or palladium and being essentially free of rhodium.

4,091,073

PROCESS FOR THE REMOVAL OF H_2S AND CO_2 FROM GASEOUS STREAMS

Hans J. S. Winkler, Basel, Switzerland, assignor to Shell Oil Company, Houston, Tex.

Filed Aug. 29, 1975, Ser. No. 608,859
Int. Cl.[2] B01D *53/34*
U.S. Cl. 423—226 14 Claims



1. A process for the removal of H_2S and CO_2 from a sour gaseous stream comprising:

A. contacting the sour gaseous stream with a lean CO_2-selective absorbent mixture containing an effective amount of the Fe (III) chelate of N-(2-hydroxyethyl) ethylene diamine triacetic acid, and producing a sweet gaseous stream and an absorbent admixture containing absorbed CO_2, sulfur, and the Fe (II) chelate of N-(2-hydroxyethyl) ethylene diamine triacetic acid,

B. removing sulfur from the absorbent admixture, and leaving a solution containing absorbed CO_2 and the Fe (II) chelate of N-(2-hydroxyethyl) ethylene diamine triacetic acid,

C. stripping the solution containing absorbed CO_2 and the said Fe (II) chelate and regenerating the Fe (III) chelate of N-(2-hydroxyethyl) ethylene diamine triacetic acid in said solution with an oxygen-containing gas, producing a lean CO_2-selective absorbent solution containing the Fe (III) chelate of N-(2-hydroxyethyl) ethylene diamine triacetic acid, and

D. returning the lean CO_2-selective absorbent solution containing the Fe (III) chelate of N-(2-hydroxyethyl) ethylene diamine triacetic acid to step A.

4,091,074

METHOD FOR REGENERATING IRON-EDTA SOLUTIONS USED FOR SCRUBBING PLUG GASES

Tokio Gorai, and Kunio Akiba, both of Chiba, Japan, assignors to Chisso Engineering Co. Ltd., Tokyo, Japan

Filed Jul. 1, 1976, Ser. No. 701,714
Claims priority, application Japan, Jan. 27, 1976, 51-7823
Int. Cl.[2] C01B *21/00*
U.S. Cl. 423—235 7 Claims

1. In the known method which comprises contacting industrial exhaust gases containing nitrogen oxides and sulfur dioxide in an absorption zone with a circulating flow of absorbing solution containing an iron EDTA complex salt and ammonium sulfite, said absorption zone being maintained under conditions whereby said absorbing solution will absorb nitrogen oxides and sulfur dioxide from said exhaust gases, the improvement in the method of treating said absorbing solution which comprises:

(*a*) withdrawing absorbing solution from said absorption zone and supplying make-up absorbing solution to said absorption zone to take the place of the removed absorbing solution,

(*b*) contacting at least a portion of said withdrawn absorbing solution with an oxygen-containing gas in an oxidation zone to thereby generate a SO_2-containing gas,

(*c*) contacting the absorbing solution removed from said oxidation zone with sulfuric acid to thereby acidify the solution and generate a SO_2-containing gas, cooling the thus acid-treated absorbing solution to crystallize EDTA, and then separating the crystallized EDTA from the cooled absorbent solution,

(*d*) heating the absorbent solution resulting from step (*c*) to thereby decompose the dithionate, imidodisulfate, and amidosulfate contained therein and to generate a SO_2-containing gas,

(*e*) contacting the solution obtained from step (*d*) with ammonia to thereby precipitate an iron compound, and then separating said iron compound from the treated solution,

(*f*) concentrating the solution resulting from step (*e*), crystallizing ammonium sulfate from the concentrated solution, and separating the crystallized ammonium sulfate from its mother liquor,

(*g*) dispersing and dissolving in water both the crystallized EDTA separated in step (*c*) and the iron compound separated from step (*e*) and incorporating said water solution and dispersion into the make-up absorbing solution set forth in step (*a*),

(*h*) conducting the SO_2-containing gas resulting from steps (*b*), (*c*) and (*d*) to a zone for the preparation of said make-up solution,

(*i*) introducing an aqueous ammonia solution into the zone for producing said make-up absorbent solution so as to maintain the pH of the absorbing solution between 5.5 and 7, and

(*j*) adding the mother liquor from step (*f*) to the solution obtained after the oxidation in accordance with step (*b*) and introducing the mixture into step (*c*).

4,091,075

METHOD FOR REMOVING SULFUR DIOXIDE FROM FLUE GASES

Leopold Pessel, Wyndmoor, Pa., assignor to American Electronic Laboratories, Inc., Colmar, Pa.

Continuation-in-part of Ser. No. 545,928, Jan. 31, 1975. This application Apr. 19, 1976, Ser. No. 678,291
Int. Cl.[2] C01B *17/00, 17/72;* B01D *53/034*
U.S. Cl. 423—242 28 Claims

1. A method of removing sulfur dioxide from flue gas comprising the steps of:

(a) subjecting the sulfur dioxide containing flue gas to an aqueous composition containing a compound of iron capable of providing ferric ions in excess of 0.6 weight percent and in which the iron ion can be reduced by sulfur dioxide from a higher valence state to a lower valence state and thereby oxidize the sulfur dioxide to sulfuric acid, and an aluminum compound capable of providing aluminum ions in an amount of not less than 0.05 weight percent, and

(b) subjecting the aqueous composition containing said iron compound in its lower valence state to the action of oxygen to reoxidize the reduced iron salt to its higher valence state and thereby regenerate the aqueous composition for use in removing additional sulfur dioxide from the flue gas.

4,091,076

METHOD OF REMOVING SULFUR EMISSIONS FROM A FLUIDIZED-BED COMBUSTION PROCESS

Gerhard John Vogel; Albert A. Jonke, both of Elmhurst, and Robert B. Snyder, Naperville, all of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed May 7, 1976, Ser. No. 684,419
Int. Cl.[2] B01J *8/00;* C01B *17/00;* B01J *23/08;* C09K *3/00*
U.S. Cl. 423—244 4 Claims

1. In a fluidized-bed, coal-combustion process wherein particulate coal containing sulfur is burned to produce combustion gases at about 900° C containing at least 0.3% sulfur dioxide by weight and the sulfur dioxide is removed by reaction with an effective amount of a metal compound to react with the sulfur

dioxide and form a metal sulfate, the improvement wherein said metal compound is calcium oxide impregnated at about 6 to 12% by weight within porous alumina having a major portion of its pore volume with pore diameters in excess of 0.2 micrometers.

4,091,077

PROCESS FOR RECOVERING FILLER FROM POLYMER

Maurice L. Smith, Kansas City, Mo., and Robert M. Smith, Olathe, Kans., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Aug. 12, 1977, Ser. No. 824,191
Int. Cl.[2] C01B *35/00*
U.S. Cl. 423—298 **5 Claims**

1. A method for recovering a boron filler material from a polymer matrix carrying said filler material comprising housing said matrix in a container, supplying carbon dioxide gas to the interior of said container, heating said container and matrix to a temperature of not less that about 525° C to react essentially only the matrix with said carbon dioxide gas, removing products of said reaction from said container, removing boron filler material from said container and subjecting said boron filler material to a water bath to dissolve therefrom water-soluble products of said reaction, forcing a gas through said material to deagglomerate said material, and subjecting said material to an acid bath to dissolve therefrom acid-soluble products of said reaction.

4,091,078

PRODUCTION OF PHOSPHINE

Klaus Hestermann, Erftstadt, Bliesheim; Jurgen Stengel, Erftstadt, Liblar; Gero Heymer, Erftstadt, Liblar, and Christian May, Erftstadt, Liblar, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Oct. 28, 1976, Ser. No. 736,556
Claims priority, application Germany, Nov. 3, 1975, 2549084
Int. Cl.[2] C01B *25/00*
U.S. Cl. 423—299 **7 Claims**

1. In a process for making phosphine from elementary yellow phosphorus and an aqueous alkali metal hydroxide solution in the presence of an alcohol, the improvement which comprises: using an alcohol having from 5 to 10 carbon atoms and a dissolving power for yellow phosphorus of more than 5 g/l; suspending the phosphorus with agitation in the said alcohol in a reaction zone; reacting the resulting suspension with the alkali metal hydroxide solution at temperatures lower than the boiling point of the alcohol; and collecting the resulting issuing gaseous phosphine, the conversion rate of said phosphorus to phosphine being about 28 to 30 percent.

4,091,079

ZEOLITE VK-2

David Evan William Vaughan, Columbia, Md., assignor to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 675,381, Apr. 9, 1976, abandoned, which is a continuation-in-part of Ser. No. 512,232, Oct. 7, 1974, abandoned. This application Sep. 16, 1977, Ser. No. 833,844
Int. Cl.[2] C01B *33/28*
U.S. Cl. 423—328 **8 Claims**

1. Zeolite VK-2 having the formula:

$$M_2O : x\ SiO_2 : Al_2O_3 : Y\ H_2O$$

wherein M is selected from the group consisting of potassium and potassium-sodium mixture, x is 2 to 4 and y is 2 to 10; and an x-ray diffraction pattern consisting of the principal reflections set forth in Table I, said zeolite VK-2 being further characterized by having the capability to sorb benzene.

6. A method for preparing the zeolite VK-2 of claim 1 comprising:

(a) (1) preparing a first reaction mixture containing the following mol ratio of reactants;

H_2O/K_2O — 10 to 20
Al_2O_3/V_2O_5 — 0.5 to 2
Al_2O_3/K_2O — 3 to 14
$SiO_2/$ — 0 to 0.6
$Al_2O_3 + V_2O_5$

and;

(2) reacting said mixture for a period of 1 to 10 days at a temperature of 0 to 50° C;

(b) (1) preparing a second reaction mixture containing the following mol ratio of reactants:

H_2O/Na_2O — 15 to 33
SiO_2/Al_2O_3 — 5 to 18
Na_2O/SiO_2 — 0.7 to 1.8

and;

(2) reacting said second mixture for a period of 0.1 hour to 10 days at a temperature of 0° to 100° C.;

(c) combining said first and second reaction mixtures obtained in steps (a) and (b) in amount wherein the weight ratio of said first reaction mixture to said second reaction mixture is in the range of about 2:1 to 25:1 to provide a third reaction mixture having the following mol ratio of reactants:

K_2O — 2.2 to 4.7
Na_2O — 0.2 to 6.5
SiO_2 — 0.5 to 8.0
Al_2O_3 — 0.8 to 3.5
V_2O_5 — 0.8 to 3.5
H_2O — 70 to 250

(d) reacting said third reaction mixture obtained in step (c) at a temperature of about 60° C. to reflux for a period of about 4 to 50 hours; and

(e) recovering the zeolite VK-2 formed during step (d).

4,091,080

METHOD FOR THE PRODUCTION OF ALPHA TYPE CALCIUM SULFATE HEMIHYDRATE

Jyuniti Kosugi, Urawa; Yoshihiko Kudo, Tokyo, and Kiyoshi Tagaya, Funabashi, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 14, 1976, Ser. No. 732,429
Claims priority, application Japan, Oct. 17, 1975, 50-124313
Int. Cl.[2] C01F *11/46*; B01J *17/00*
U.S. Cl. 423—555 **5 Claims**

1. A method for the production of alpha type hemihydrated calcium sulfate, which method comprises:

(a) suspending hydrated calcium sulfate containing ½ to 2 mols of water of crystallization in an aqueous solution containing at least 10% by weight of at least one member

selected from the group consisting of magnesium salts of lower monocarboxylic acids having one to four carbon atoms and zinc salts of lower monocarboxylic acids having one to four carbon atoms; and

(b) subsequently heating the resultant suspension under atmospheric pressure at a temperature in the range of from 80° C to the boiling point of said aqueous solution.

4,091,081

PREPARATION OF NITROGEN TRIFLUORIDE

Andrew Joseph Woytek, Allentown, and John Theodore Lileck, Tamaqua, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Apr. 19, 1977, Ser. No. 788,724
Int. Cl.[2] C01B *21/52*
U.S. Cl. 423—406 8 Claims

1. A process for preparing nitrogen trifluoride which comprises the step of contacting elemental fluorine in vapor phase with liquid phase ammonium acid fluoride maintained at a temperature of from about the melting temperature to a temperature not substantially above 400° F for a time sufficient to effect reaction and thereby form nitrogen trifluoride.

4,091,082

HYDROCARBON SOLUBLE CATALYST CONTAINING DINITROGEN OR DIHYDROGEN TRANSITION METAL COMPLEX

Donald Earl Gessell, Baton Rouge, La., and Kirby Lowery, Jr., Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jun. 4, 1976, Ser. No. 693,071
Int. Cl.[2] C01B *21/00*; B01J *31/00, 27/24*; C01B *11/00*
U.S. Cl. 423—413 7 Claims

1. A hydrocarbon soluble complex of transition metal comprising a transition metal of Groups 4*b*, 6*b*, 7*b* and 8 of Mendeleev's Periodic Table of Elements having a valence greater than two or divalent nickel, a number of halide anionic groups sufficient to satisfy the valence charge on the transition metal, and molecular nitrogen and/or molecular hydrogen bonded to the transition metal through a coordinate covalent bond.

4,091,083

METHOD FOR THE PRODUCTION OF GRAPHITE-HYDROGENSULFATE

Alfred Hirschvogel, Langweid, and Friedrich Wagner, Gersthofen, both of Germany, assignors to Sigri Elektrographit GmbH, Meitingen near Augsburg, Germany

Filed Feb. 11, 1977, Ser. No. 767,775
Claims priority, application Germany, Mar. 4, 1976, 2608866
Int. Cl.[2] C01B *31/00, 31/04*
U.S. Cl. 423—415 R 5 Claims

1. Method for the manufacture of graphite-hydrogensulfate which comprises dispersing ground particles of crystalline graphite having at most a small amount of fine particles of less than 0.075 mm, in sulfuric acid, agitating the mixture of graphite particles and sulfuric acid to maintain the particles in a dispersed state in the sulfuric acid, admixing 2–5 parts by weight hydrogen peroxide to 100 parts by weight sulfuric acid by thereafter adding a 80–90% hydrogen peroxide to the agitated dispersion and continuing the agitation until the graphite is converted to graphite-hydrogensulfate, separating the liquid containing acid from the solid converted graphite in the dispersion, and washing the solid to remove residual acid in the solid.

4,091,084

PURIFICATION OF HgI_2 FOR NUCLEAR DETECTOR FABRICATION

Michael M. Schieber, Goleta, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Continuation of Ser. No. 592,484, Jul. 1, 1975, abandoned. This application Jun. 6, 1977, Ser. No. 804,126
Int. Cl.[2] C01G *13/04*
U.S. Cl. 423—491 8 Claims

1. A process for the purification of mercuric iodide raw material utilized in the growth of high-quality crystals comprising the sequential steps of: synthesis of mercuric iodide from essentially pure mercury and iodine purified by repeated sublimation by melting the mercury and iodine in stoichiometric amounts in an evacuated reaction tube at a temperature of 260° to 300° C for a time period of one-half to six hours, repeated sublimation of the synthetic mercuric iodine material by subjecting the synthetic mercuric iodide material in a gradient furnace having a temperature from about 60 to 80° C in the cool zone thereof to about 100° to 140° C in the hot zone thereof and subjecting the material to from 6 to 30 cycles through the gradient furnace, and zone refining of the thus resublimed material by subjecting the material to 30 to 100 melting passes through a furnace having a temperature of 259° to 300° C.

4,091,085

PROCESS FOR THERMAL DECOMPOSITION OF ALUMINUM CHLORIDE HYDRATES BY INDIRECT HEAT

Lothar Reh, Bergen-Enkheim; Ludolf Plass, Kronberg, both of Germany, and Philippe Marchessaux, Chemin des Trois Moulins, France, assignors to Aluminum Pechiney, Lyon, France

Filed Aug. 11, 1977, Ser. No. 823,644
Claims priority, application Germany, Aug. 16, 1976, 2636854
Int. Cl.[2] C01F *7/30*
U.S. Cl. 423—625 20 Claims

1. A continuous process for the thermal decomposition of aluminum chloride hydrate into solid aluminum oxide and gaseous hydrogen chloride comprising

(1) introducing the aluminum chloride hydrate into a decomposition reaction zone,

(2) introducing a fluidizing gas into the decompositon reaction zone to maintain the aluminum chloride hydrate in a fluidized state within said reaction zone,

(3) indirectly heating the aluminum chloride hydrate, while in the fluidized state in said reaction zone until a preponderant portion of the thermal decomposition of the aluminum chloride hydrate has taken place in said reaction zone,

(4) separating the effluent from the reaction zone into a gaseous phase containing hydrogen chloride and a solid phase of partially decomposed aluminum chloride hydrate,

(5) passing the separated solid phase of partially decomposed aluminum chloride hydrate to a directly heated calcining zone,

(6) calcining the partially decomposed aluminum chloride hydrate in the calcining zone to advance the thermal decomposition of the partially decomposed aluminum chloride hydrate,

(7) passing the calcined aluminum chloride hydrate from the calcining zone into a residence reaction zone,

(8) introducing gases into the residence reaction zone in an amount to maintain the solid material in a fluidized state,

(9) recycling a portion of the solid material from the residence reaction zone to the calcining zone, and

(10) cooling a portion of the solid material from the residence reaction zone as product.

4,091,086
PROCESS FOR PRODUCTION OF HYDROGEN

Saul G. Hindin, Mendham, and Joseph C. Dettling, Jackson, both of N.J., assignors to Engelhard Minerals & Chemicals Corporation, Iselin, N.J.

Filed Dec. 20, 1976, Ser. No. 752,010
Int. Cl.[2] C01B *1/05, 1/08*
U.S. Cl. 423—648 R **9 Claims**

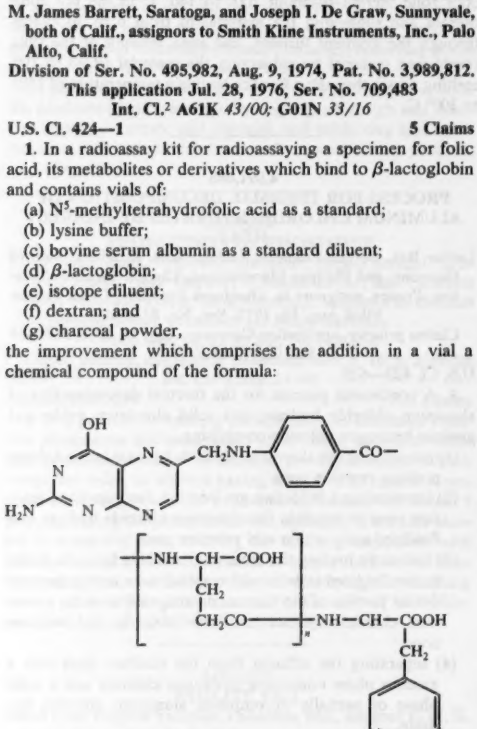
1. A process for producing hydrogen from methanol wherein a feedstock comprising methanol and steam is passed over a catalytic composition consisting essentially of zinc oxide, copper oxide, thorium oxide and aluminum oxide at a temperature in the range of from about 300° F to about 800° F and a pressure of from about 20 to 100 psig, whereby the activity maintenance of the composition for said process is superior relative to a composition substantially the same but lacking thoria.

4,091,087
FOLIC ACID DERIVATIVES AND USE IN RADIO-ASSAY

M. James Barrett, Saratoga, and Joseph I. De Graw, Sunnyvale, both of Calif., assignors to Smith Kline Instruments, Inc., Palo Alto, Calif.

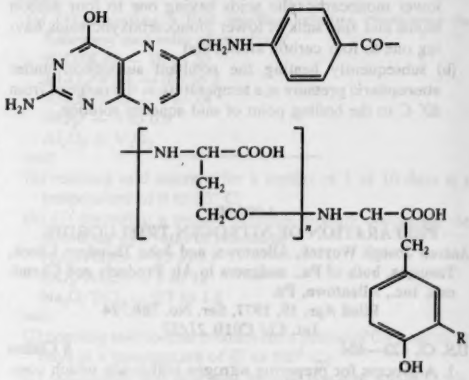
Division of Ser. No. 495,982, Aug. 9, 1974, Pat. No. 3,989,812. This application Jul. 28, 1976, Ser. No. 709,483
Int. Cl.[2] A61K *43/00*; G01N *33/16*
U.S. Cl. 424—1 **5 Claims**

1. In a radioassay kit for radioassaying a specimen for folic acid, its metabolites or derivatives which bind to β-lactoglobin and contains vials of:
(a) N^5-methyltetrahydrofolic acid as a standard;
(b) lysine buffer;
(c) bovine serum albumin as a standard diluent;
(d) β-lactoglobin;
(e) isotope diluent;
(f) dextran; and
(g) charcoal powder,
the improvement which comprises the addition in a vial a chemical compound of the formula:



wherein n is a positive integer of from 1 to 3 and R is radioactive iodine: I^{125} or I^{131}; to said kit.

3. In a method of radioassaying a specimen for folic acid, its metabolites or derivatives which bind to β-lactoglobin and employs as assay material:
(a) lysine buffer;
(b) isotope solution;
(c) β-lactoglobin;
(d) dextran; and
(e) charcoal powder;
the improvement which comprises adding to said assay material a chemical compound of the formula:



wherein n is a positive integer of from 1 to 3 and R is radioactive iodine: I^{125} or I^{131}; counting for radioactivity and comparing the count with that obtained from a standard curve.

4,091,088
PHENOLIC AMINO-CARBOXYLIC ACID COMPLEXES FOR FORMING RADIOPHARMACEUTICALS

Frederick Charles Hunt, Oatley, and John Gerald Wilson, Strathfield, both of Australia, assignors to Australian Atomic Energy Commission, Coogee, Australia

Continuation-in-part of Ser. No. 655,034, Feb. 3, 1976. This application Sep. 30, 1976, Ser. No. 728,099
Claims priority, application Australia, Feb. 19, 1975, 0655/75; Jul. 29, 1975, 2552/75
The portion of the term of this patent subsequent to May 9, 1995, has been disclaimed.
Int. Cl.[2] A61K *27/00, 43/00*
U.S. Cl. 424—1 **15 Claims**

1. A reagent which is adapted to be labelled with technetium-99m for use as a hepato-biliary imaging radiopharmaceutical for use on an animal, the reagent comprising a stannous complex of a phenolic aminocarboxylic acid chelating agent selected from the group consisting of an ethylene diamine di(hydroxy phenyl carboxylic acid) and a di (hydroxy benzyl) ethylene diamine dicarboxylic acid.

4,091,089
METHOD FOR QUANTITATIVE DETERMINATION OF AN ANTIGENIC SUBSTANCE

Kenji Chichibu, Niiza, and Kiyoshige Wakabayashi, Ohmiya, both of Japan, assignors to Chugai Seiyaku Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 31, 1976, Ser. No. 672,497
Claims priority, application Japan, Apr. 10, 1975, 50-42803
Int. Cl.[2] G01N *21/02, 31/02, 33/16*
U.S. Cl. 424—12 **2 Claims**

1. A method for the quantitative determination of antigenic substance which comprises adding to a sample the same exogenous antigenic substance as that to be assayed, separately prepared, in such an amount as to give the maximum precipitation by the reaction with the antibody used, combining the resulting mixtures with an antibody specific to the antigenic substance to be assayed to cause antigen-antibody reaction, and measuring turbidimetrically the amount of precipitates formed by the reaction, whereby the amount of precipitate will always be on the antigen-surplus side of the precipitate versus antigen curve formed for any given amount of antibody.

4,091,090
POTENTIATED ANESTHETICS

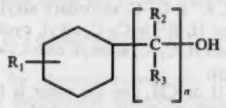
Tibor Sipos, Jackson, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Division of Ser. No. 595,986, Jul. 14, 1978, Pat. No. 4,006,218, which is a continuation of Ser. No. 486,287, Jul. 8, 1974, abandoned, which is a continuation-in-part of Ser. No. 285,682, Sep. 1, 1972, abandoned. This application Dec. 10, 1976, Ser. No. 748,868

Int. Cl.[2] A61K *31/445, 31/045, 31/165;* A61L *9/04*

U.S. Cl. 424—45 25 Claims

1. A topical anesthetic composition comprising an effective amount of a topical anesthetic agent and an amount of a penetrant accelerator effective to enhance the skin penetration of said anesthetic agent, said penetrant accelerator being selected from the group consisting of the cyclohexyl substituted alkanols of the structure



wherein R_1 is C_1 to C_4 alkyl, halogen or hydrogen; R_2 and R_3 are independently selected from hydrogen, C_1 to C_3 alkyl, and cyclopropyl; and n is 1 to 4, provided that only one of said R_2 and R_3 may be propyl or cyclopropyl.

23. In the topical inducement of anesthesia by applying to the skin of an animal a topical anesthetic agent, the improvement comprising potentiating the activity or penetration of the anesthetic agent by applying the same in conjunction with a potentiator which is a primary, secondary or tertiary cyclohexylalkanol or alkylcyclohexyl alkanol selected from the group consisting of cyclohexylmethanol, 1-cyclohexylethanol, 2-cyclohexylethanol, 1-cyclohexyl-1-propanol, (cyclohexyl)-dimethylcarbinol, (4,isoproyl-cyclohexyl)-dimethylcarbinol, 3-cyclohexyl-1-propanol, 2-cyclohexyl-1-propanol, 1-cyclohexyl-2-propanol, 2-cyclohexyl-1, 1-dimethylethanol, 2-cyclohexyl-2-methylpropanol, 2-cyclohexyl-1-methylpropanol, 2-cyclohexyl-1, 2-dimethylpropanol, 2-cyclohexyl-1, 1-dimethylpropanol, 3-cyclohexyl-2-methylpropanol, 3-cyclohexyl-1-methylpropanol, 3-cyclohexylbutanol, 3-cyclohexyl-2-methylbutanol and 3-cyclohexyl-1, 2-dimethylbutanol.

4,091,091
STABILIZED NITROGLYCERIN TABLETS

Paul Meredith Terrill, Danville, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Nov. 8, 1973, Ser. No. 414,019

Int. Cl.[2] A61K *9/20, 31/21, 31/79*

U.S. Cl. 424—80 9 Claims

1. A sublingual pharmaceutical composition consisting essentially of nitroglycerin, polyvinylpyrrolidone and at least one conventional pharmacologically inert, non-toxic, water-soluble sublingual pharmaceutical excipient chemically compatible with nitroglycerin, said sublingual pharmaceutical composition having a stabilized nitroglycerin content as compared to sublinqual pharmaceutical compositions prepared only from nitroglycerin and at least one of said conventional sublingual pharmaceutical excipients, or a combination of said excipients, and wherein nitroglycerin is the sole pharmacologically active agent, and polyvinylpyrrolidone is the sole stabilizer therefor, and wherein the nitroglycerin is admixed with the polyvinylpyrrolidone in a weight ratio of about 10:1 to 1:4.

4,091,092
POLYMYXIN F AND PROCESS OF PRODUCING POLYMYXIN F

William L. Parker, Pennington; Edward Meyers, East Brunswick; Maxwell W. Nimeck, North Brunswick, and William E. Brown, Princeton, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 724,886, Sep. 20, 1976, abandoned. This application Jan. 24, 1977, Ser. No. 761,578

Int. Cl.[2] A61K *35/00*

U.S. Cl. 424—118 2 Claims

1. Polymyxin F, or an acid salt thereof, said polymyxin F being a mixture of three basic peptides comprising in an approximate molar ratio of 5:1:1:1:2:1 2,4-diaminobutyric acid, threonine, serine, isoleucine, leucine, and a mixture of the acyl residues of 6-methyloctanoic acid, isooctanoic acid and octanoic acid; polymyxin F hydrochloride (1:4) having the infrared spectrum in potassium bromide as shown in FIG. 1 and the following physical characteristics: approximate elemental analysis C, 49.68; H, 8.05; N, 16.13; Cl, 10.96; and melting point of about 213° C to 219° C, in vacuo.

2. A process for producing polymyxin F which comprises fermenting *Bacillus circulans* A.T.C.C. No. 31228 under submerged aerobic conditions in an aqueous nutrient medium comprising an assimilable carbon source and an assimilable nitrogen source.

4,091,093
PROTEASE INHIBITORS

Shinichi Kojima, Nishinomiya; Kazuro Nakamura, Takarazuka; Ten Koide, Toyonaka, and Shigeo Ogino, Nishinomiya, all of Japan, assignors to Sumitomo Chemical Company Limited, Osaka, Japan

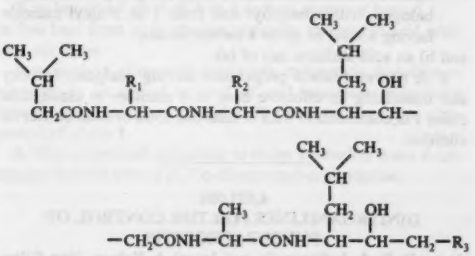
Filed Sep. 8, 1976, Ser. No. 721,503

Claims priority, application Japan, Sep. 12, 1975, 50-111337; Sep. 16, 1975, 50-112387; Sep. 16, 1975, 50-112388

Int. Cl.[2] A61K *37/00;* C07C *103/52*

U.S. Cl. 424—177 6 Claims

1. A procidin of the general formula:



wherein R_1 and R_2, which may either be identical or different, represent isopropyl or isopropyl methyl; and R_3 represents hydrogen when both R_1 and R_2 are isopropyl or carboxylic when R_1 and R_2 are different or both R_1 and R_2 are isopropyl methyl, said procidin occurring as a mixture of compounds when R_1 and R_2 are different.

6. A method of healing or preventing ulcer formation comprising administering a procidin of claim 1 in an amount effective to heal or prevent ulcer formation.

4,091,094
9-AZARIBOFLAVIN AND PHARMACEUTICAL COMPOSITION CONTAINING SAME

Donald W. Graham, Mountainside, and Edward F. Rogers, Middletown, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Aug. 23, 1976, Ser. No. 716,497
Int. Cl.[2] A61K *31/525;* **C07H** *19/22*
U.S. Cl. 424—180 **6 Claims**

2. A pharmaceutically acceptable composition for the treatment of coccidiosis comprising an inert carrier and an effective amount of the compound of the structural formula:

4,091,095
PHOSPHINYL COMPOUNDS

Alfons Söder, Frankfurt-Schwanheim, and Klaus Perrey, Bonn-Bad Godesberg, both of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed Jul. 6, 1976, Ser. No. 702,604
Int. Cl.[2] A61K *31/66;* **C07C** *101/50*
U.S. Cl. 424—211 **9 Claims**

1. A member selected from the group consisting of a) a compound of the formula

wherein

R^2 has a total of from 3 to 7 carbon atoms and is a member selected from the group consisting of dialkylphosphinylalkyl and dialkylphosphinylhydroxyalkyl; and

A designates a nucleus which is optionally substituted by at least one substituent selected from the group consisting of halogen, trifluoromethyl and from 1 to 3 alkyl radicals having a total of up to 4 carbon atoms;

and b) an acid-addition salt of (a).

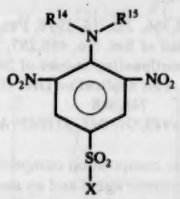
9. A pharmaceutical preparation having analgesic activity and containing an effective dose of a member as claimed in claim 1 in combination with at least one solid or fluid carrier or additive.

4,091,096
DINITROANILINES FOR THE CONTROL OF PHYTOPATHOGENS

James R. Beck, Indianapolis, and Joseph A. Yahner, New Palestine, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 668,360, Mar. 19, 1976, abandoned, which is a continuation-in-part of Ser. No. 589,312, Jun. 23, 1975, abandoned. This application Aug. 31, 1976, Ser. No. 719,299
Int. Cl.[2] A01N *9/20*
U.S. Cl. 424—229 **16 Claims**

1. A method for reducing the incidence and severity of grape downy mildew which comprises applying to the foliage of the host plant a fungicidally-effective amount of a dinitroaniline compound having one of the following formulae:



(V)

wherein

X is $N(R^{16})_2$, $N{=}S(R^{17})_2$, $N(R^{18})CH_2Het$, $N{=}CHN(CH_3)_2$, $N{=}C(R^{19})OR^{20}$, or $N{=}CHOR^{21}$;

R^{14} is H, C_3–C_4 alkenyl or C_1–C_4 alkyl;

when R^{14} is H, R^{15} is C_3–C_7 secondary alkyl;

when R^{14} is not H, R^{15} is C_1–C_5 alkyl, cyclopropylmethyl, C_5–C_6 cycloalkyl, C_3–C_4 alkenyl, halo C_2–C_3 alkyl or halo C_3–C_4 alkenyl;

one of R^{16} is H or CH_3 and the other is H, $SCCl_3$, CH_3, phenylthio, OH, C_1–C_4 alkoxy or NH_2;

each R^{17} is independently C_1–C_2 alkyl, phenyl or benzyl;

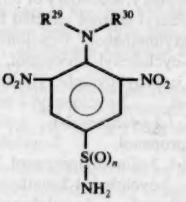
Het is 2,5-dimethylpyrrolidino, piperidino, morpholino, C_1–C_2 alkylpiperidino, hexahydroazepino, 2,2-dimethylaziridino, or C_1–C_2 alkylpiperazino;

R^{18} is H or methyl;

R^{19} is C_1–C_2 alkyl or phenyl;

R^{20} is C_1–C_4 alkyl; and

R^{21} is C_1–C_2 alkyl;



(IX)

wherein

R^{29} is H, C_3–C_4 alkenyl or C_1–C_3 alkyl;

when R^{29} is H, R^{30} is C_3–C_7 secondaryalkyl;

when R^{29} is not H, R^{30} is C_1–C_4 alkyl; and

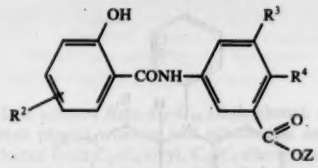
n is 1.

4,091,097
TREATMENT OF ELEVATED HISTAMINE AND URIC ACID LEVELS

Hamao Umezawa; Tomio Takeuchi, both of Tokyo; Akira Takamatsu, and Kenji Kayahara, both of Yokohama, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Tokyo, Japan

Division of Ser. No. 674,009, Apr. 5, 1976, Pat. No. 4,024,253, which is a division of Ser. No. 461,772, Apr. 17, 1977, Pat. No. 3,973,038. This application Feb. 17, 1977, Ser. No. 769,482
Claims priority, application Japan, Apr. 20, 1973, 48-44922; Dec. 10, 1973, 48-140111
Int. Cl.[2] A61K *31/60*
U.S. Cl. 424—230 **16 Claims**

1. A method for chemotherapeutically treating a living animal having a biochemical disorder characterized by an abnormally high body level of histamine which comprises administering a compound having the formula



wherein

R^2 is substituted either at the 4'-position or at the 5'-position and is hydrogen, fluoro, bromo, chloro, hydroxy or lower alkyl;

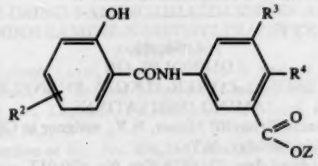
R^3 is chloro, bromo or lower alkyl;

R^4 is hydroxy, amino or lower alkoxy, and

Z is hydrogen or lower alkyl or a nontoxic, pharmaceutically acceptable metal salt of said compound when Z is hydrogen

to said animal in a dosage sufficient to lower said histamine level.

9. A method for chemotherapeutically treating a living animal having a biochemical disorder characterized by an abnormally high body level of uric acid which comprises administering a compound having the formula



wherein

R^2 is substituted either at the 4'-position or at the 5'-position and is hydrogen, fluoro, bromo, chloro, hydroxy or lower alkyl;

R^3 is chloro, bromo or lower alkyl;

R^4 is hydroxy, amino or lower alkoxy, and

Z is hydrogen or lower alkyl or a nontoxic, pharmaceutically acceptable metal salt of said compound when Z is hydrogen

to said animal in a dosage sufficient to lower said uric acid level.

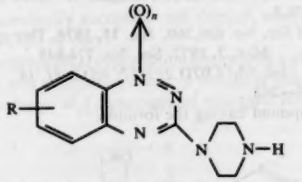
4,091,098

3-(1-PIPERAZINYL)-1,2,4-BENZOTRIAZINES AND N-OXIDES

William C. Lumma, Jr., Pennsburg, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

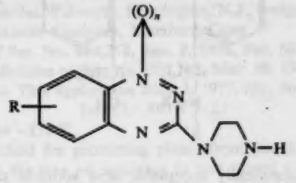
Filed Apr. 25, 1977, Ser. No. 790,363
Int. Cl.² C07D *251/72;* A61K *31/53*
U.S. Cl. 424—249 **6 Claims**

1. A compound of structural formula:



or a pharmaceutically acceptable salt thereof, wherein *n* is 0 or 1; R is hydrogen, halo, trifluoromethyl, lower alkyl, lower alkylthio, lower alkoxy or cyano.

5. A method of decreasing food intake in a patient in need of such treatment comprising the administration of an effective amount of a compound of structural formula:



or a pharmaceutically acceptable salt thereof, wherein

n is 0 or 1;

R is hydrogen, halo, trifluoromethyl, lower alkyl, lower alkylthio, lower alkoxy or cyano.

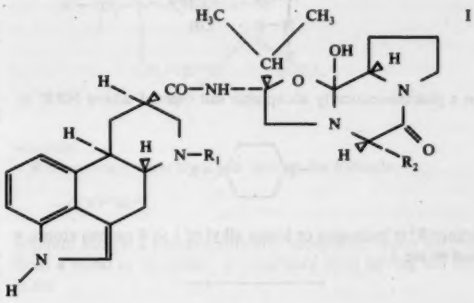
4,091,099

6-HYDROCARBON-ERGOPEPTINES

Theodor Fehr, Dornach, and Paul Stadler, Biel-Benken, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Filed Dec. 31, 1975, Ser. No. 645,568
Claims priority, application Switzerland, Jan. 6, 1975, 68/75
Int. Cl.² C07D *519/02;* A61K *31/48*
U.S. Cl. 424—250 **15 Claims**

1. A compound of formula I,



I

wherein

R_1 is isopropyl, isobutyl, isopentyl or phenethyl, and

R_2 is branched alkyl of 3 or 4 carbon atoms or benzyl,

in free base form or in pharmaceutically acceptable acid addition salt form.

5. A method of treating hypotonia, orthostatic disorders or migraine in an animal in need of said treatment comprising administering a therapeutically effective amount of a compound of claim 1.

6. The compound according to claim 1 which is 6-nor-6-isopropyl-9,10-dihydro-2'β, 5'α-diisopropyl-ergopeptine.

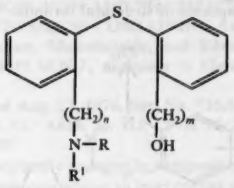
4,091,100

SULFIDE COMPOUNDS

Nariman Bomanshaw Mehta, and Lawrence Edward Brieaddy, both of Raleigh, N.C., assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Division of Ser. No. 597,697, Jul. 21, 1975, Pat. No. 3,997,540.
This application Sep. 23, 1976, Ser. No. 726,007
Int. Cl.² C07D *295/08;* A61K *31/495*
U.S. Cl. 424—250 **18 Claims**

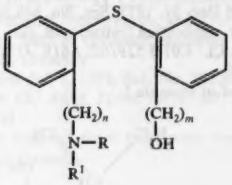
1. A compound of the formula



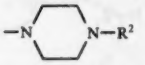
or a pharmaceutically acceptable acid addition salt thereof where NRR^1 is

where R^2 is hydrogen or lower alkyl of 1 to 4 carbon atoms and *n* and *m* are 1.

3. A pharmaceutical preparation consisting essentially of an effective antidepressant amount of the compound of the formula



or a pharmaceutically acceptable salt thereof where NRR^1 is



where R^2 is hydrogen or lower alkyl of 1 to 4 carbon atoms, *n* and *m* are 1.

4,091,101

6-(1-PIPERAZINYL)QUINOXALINE

William C. Lumma, Jr., Pennsburg, and Walfred S. Saari, Lansdale, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Jun. 15, 1977, Ser. No. 806,898
Int. Cl.[2] A61K *31/495;* C07D *241/40*
U.S. Cl. 424—250 **3 Claims**

1. The compound, 6-(1-piperazinyl)quinoxaline or a pharmaceutically acceptable salt thereof.

3. A pharmaceutical anorectic composition comprising a pharmaceutical carrier and an effective amount of 6-(1-piperazinyl)quinoxaline or a pharmaceutically acceptable salt thereof.

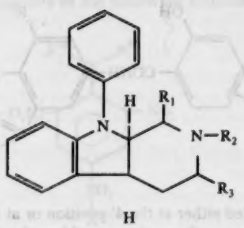
4,091,102

ANTI-DEPRESSANT TRANS-HEXAHYDROPYRIDO[3,4-B]INDOLES

Sonia Ruth Teller, Louisville, Ky., assignor to Endo Laboratories, Inc., Garden City, N.Y.

Continuation-in-part of Ser. No. 606,871, Aug. 22, 1975, abandoned. This application Jun. 22, 1976, Ser. No. 695,361
Int. Cl.[2] A61K *31/445;* C07D *471/04*
U.S. Cl. 424—256 **9 Claims**

1. A compound of the formula



H

wherein

R_1 = H, CH_3, or C_2H_5;

R_2 = H, C_1-C_3 alkyl or allyl;

R_3 = H, CH_3, or C_2H_5;

provided that the total number of carbon atoms in $R_1 + R_2 + R_3$ is not less than one and not more than four, and provided further that one of R_1 or R_3 must be other than H; and its pharmaceutically suitable salts.

7. A method of alleviating depression in a mammal which comprises administering to the mammal an effective antidepressant amount of a compound of claim 1.

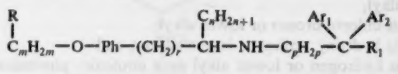
4,091,103

QUINOLYL OR ISOQUINOLYL-LOWER-ALKOXY-PHENYLENE-AMINO DERIVATIVES

John E. Francis, Briarcliff Manor, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jun. 23, 1976, Ser. No. 699,017
Int. Cl.[2] A61K *31/47;* C07D *215/14, 217/16*
U.S. Cl. 424—258 **5 Claims**

1. A compound of the formula



wherein R is unsubstituted 2-, 3- or 4-quinolyl, 1-,3- or 4-isoquinolyl, or such radicals substituted by one or two members selected from lower alkyl, hydroxy, lower alkoxy, halogeno, trifluoromethyl and amino; Ph is unsubstituted phenylene, or phenylene substituted by one member listed for R, each of Ar_1 and Ar_2 is unsubstituted phenyl or phenyl substituted by one member listed for R, each of *m*, *n* and *p* is an integer from 1 to 4, *r* is the integer 1 or 2 and R_1 is hydrogen or hydroxy, or a therapeutically useful acid addition salt thereof.

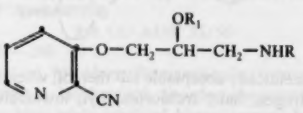
4,091,104

SUBSTITUTED (3-LOWERALKYLAMINO-2-R_1O-PROPOXY)PYRIDINES, THEIR PREPARATION AND USE

John J. Baldwin, Lansdale, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

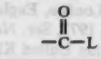
Division of Ser. No. 696,260, Jun. 15, 1976. This application Mar. 7, 1977, Ser. No. 774,848
Int. Cl.[2] C07D *213/57;* A61K *31/34*
U.S. Cl. 424—263 **9 Claims**

1. A compound having the formula:



wherein

R is C_{3-C4} branched alkyl
R_1 is



wherein L is selected from C_1–C_{10} alkyl, phenyl, mono- and disubstituted phenyl wherein said substituents are independently selected from C_1–C_4 alkyl, C_1–C_4 alkoxy and halo, and pharmaceutically acceptable salts thereof.

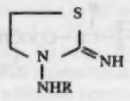
8. A method of treating hypertension in animals which comprises administering an effective amount of a compound of claim 1.

4,091,105
2-IMINO-3-AMINOTHIAZOLIDINES AND INDOLEAMINE-N-METHYLTRANSFERASE INHIBITION

Joshua Rokach, Laval, Canada; Clarence S. Rooney, Worcester, Pa.; Grant W. Reader, Montreal, Canada, and Edward J. Cragoe, Jr., Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

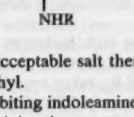
Continuation of Ser. No. 696,244, Jun. 15, 1976, abandoned. This application Aug. 12, 1977, Ser. No. 823,909
Int. Cl.[2] C07D *277/18;* A61K *31/425*
U.S. Cl. 424—270 3 Claims

1. A compound of structural formula:



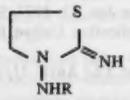
or pharmaceutically acceptable salt thereof, wherein R is hydrogen, methyl, or ethyl.

2. A method of inhibiting indoleamine-N-methyl-transferase which comprises administering to a patient in need of such treatment an amount effective to inhibit indoleamine-N-methyltransferase of a compound of structural formula:



or pharmaceutically acceptable salt thereof, wherein R is hydrogen, methyl, or ethyl.

3. A pharmaceutical composition comprising a pharmaceutical carrier and an amount effective to inhibit indoleamine-N-methyltransferase of a compound of structural formula:



or pharmaceutically acceptable salt thereof, wherein R is hydrogen, methyl, or ethyl.

4,091,106
1,2-DIALKYL-3(OR 3,5)-N-HETEROCYCLIC PYRAZOLIUM SALTS OR DERIVATIVES THEREOF AS FUNGICIDAL AGENTS

Bryant Leonidas Walworth, Pennington, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 694,268, Jun. 9, 1976, Pat. No. 4,053,610, which is a division of Ser. No. 556,748, Mar. 10, 1975, Pat. No. 3,970,754. This application May 3, 1977, Ser. No. 793,466
Int. Cl.[2] A01N *9/22*
U.S. Cl. 424—273 P 3 Claims

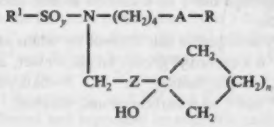
1. A method for protecting plants from attack from fungi comprising the step of: applying to said plants a fungicidally effective amount of 3-(hexahydro-1H-azepin-1-yl)-1,2-dimethyl-5-phenylpyrazolium iodide.

4,091,107
8-AZA-9-OXO(AND DIOXO)-THIA-11,12-SECOPROSTAGLANDINS

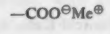
Edward J. Cragoe, Jr., Lansdale, and James H. Jones, Blue Bell, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 669,123, Mar. 22, 1976, Pat. No. 4,033,996, which is a continuation-in-part of Ser. No. 580,497, May 23, 1975, abandoned, which is a continuation-in-part of Ser. No. 418,341, Nov. 23, 1973, abandoned, which is a continuation-in-part of Ser. No. 354,273, Apr. 25, 1973, abandoned. This application Nov. 11, 1976, Ser. No. 741,074
Int. Cl.[2] C07C *143/74, 143/75, 145/02;* A61K *31/195*
U.S. Cl. 424—274 11 Claims

1. The compound of the formula:



wherein
R is carboxy, a carboxy salt having the formula:



wherein $Me^{\oplus}$ is a pharmaceutically acceptable cation derived from a metal or an amine, or a carboxy ester having the formula:

wherein Y is alkyl having 1–10 carbon atoms, 1-succinimidoethyl, 1-(pivaloyloxy)ethyl, 2-acetamidoethyl, or diloweralkylamino-loweralkyl;
A is ethylene, trimethylene, α-methylethylene, β-methylethylene, α,α-dimethylethylene, or β,β-dimethylethylene;
y is 1 or 2;
R^1 is methyl, ethyl, propyl, or isopropyl;
Z is ethylene, vinylene, or ethynylene; and
n is an integer of from 2 to 6 inclusive.

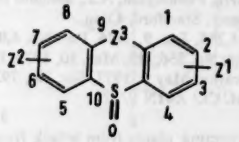
4,091,108
ANTIALLERGIC PHARMACEUTICAL COMPOSITION AND USE

John Frederick Batchelor, Beckenham, and John Henry Gorvin, London, both of England, assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

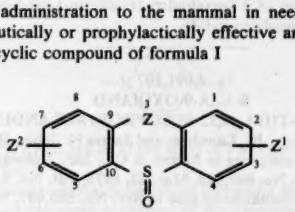
Division of Ser. No. 394,421, Sep. 5, 1973, abandoned. This application Oct. 3, 1975, Ser. No. 619,175
Claims priority, application United Kingdom, Aug. 17, 1973, 38951/73; Sep. 6, 1972, 41434/72
Int. Cl.[2] A61K *31/41, 31/38, 31/39, 31/385*
U.S. Cl. 424—275 7 Claims

1. A method for the treatment or prophylaxis of an allergic

condition selected from the group consisting of asthma, hay fever, conjunctivitis, urticaria and eczema of a mammal com-



prising administration to the mammal in need thereof of a therapeutically or prophylactically effective antiallergic dose of a tricyclic compound of formula I



(I)

wherein Z^1 is carboxyl in the 1-, 2-, 3-, or 4-position Z^2 is hydrogen or a substituent in the 5-, 6-, 7-, or 8- position selected from the group consisting of carboxyl, alkylsulphonyl, alkylsulphinyl, thioalkyl, amino, acylamino, nitro, cyano, halogen, acyl, alkyl and alkoxy wherein the "alkyl" moiety of each of the acyl, alkyl, alkoxy, thioalkyl, acylamino, alkylsulphinyl and alkylsulphonyl groups has 1 to 6 carbon atoms; and Z^3 is sulphur or sulphoxide;

a pharmaceutically acceptable salt thereof or when at least one of Z^1 and Z^2 is a carboxyl group, an alkyl ester, unsubstituted amide, N-alkylamide or N, N-dialkylamide wherein "alkyl" has 1 to 6 carbon atoms, thereof.

4,091,109

DIPHENYLETHER DERIVATIVES AND USE THEREOF AS AN ACARICIDE

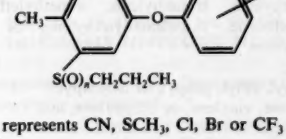
Yukio Aoki, Omiya; Shizuo Wakita, Ageo; Shoichi Kato, Ageo; Iwao Tejima, Ageo, and Shuichi Ishida, Omiya, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 18, 1976, Ser. No. 697,532

Int. Cl.[2] A01N *9/12, 9/20;* **C07C** *121/52, 149/32*

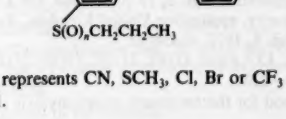
U.S. Cl. 424—304 **3 Claims**

1. A compound represented by the formula



wherein R represents CN, SCH_3, Cl, Br or CF_3 and *n* represents 0 or 1.

3. A method for exterminating acarids comprising applying to acarids and their eggs an acaricidally effective amount of a compound of the formula



wherein R represents CN, SCH_3, Cl, Br or CF_3 and *n* represents 0 or 1.

4,091,110

INSECTICIDAL ESTERS

Nazim Punja, Wokingham, England, assignor to Imperial Chemical Industries Limited, London, England

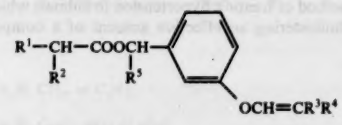
Filed Apr. 11, 1977, Ser. No. 786,394

Claims priority, application United Kingdom, Apr. 12, 1976, 14761/76

Int. Cl.[2] A01N *9/20, 9/24;* **C07C** *69/76, 121/75*

U.S. Cl. 424—304 **9 Claims**

1. An ester of formula:



wherein R^1 is branched alkyl of up to four carbon atoms, R^2 is phenyl, or halo- or alkyl-substituted phenyl containing up to 4-carbon atoms in the alkyl moiety, R^3 and R^4 are chloro, and R^5 is hydrogen or cyano.

8. A composition for use in combating insect pests at a locus which comprises an insecticidally effective amount of an ester according to claim 1 in association with an agriculturally and horticulturally acceptable diluent or carrier material.

4,091,111

SUBSTITUTED-ACETIC ACID ESTER

Nobuo Ohno, Toyonaka; Isao Ohno, Kawanishi; Toshio Nishioka, Takarazuka; Hisami Takeda, Takarazuka, and Kiyoshi Kasamatsu, Takarazuka, all of Japan, assignors to Sumitomo Chemical Company Limited, Osaka, Japan

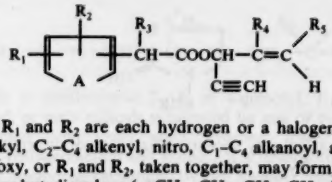
Filed Oct. 1, 1976, Ser. No. 728,840

Claims priority, application Japan, Oct. 21, 1975, 50-127168

Int. Cl.[2] C07C *69/76;* **A01N** *9/24*

U.S. Cl. 424—308 **10 Claims**

1. A compound of the formula,



wherein R_1 and R_2 are each hydrogen or a halogen atom, a C_1–C_4 alkyl, C_2–C_4 alkenyl, nitro, C_1–C_4 alkanoyl, an C_1–C_4 alkanoyloxy, or R_1 and R_2, taken together, may form, a C_3–C_5 alkylene or butadienylene (—CH=CH—CH=CH—) ring; R_3 is a C_2–C_4 alkyl, C_2–C_4 alkenyl, propargyl, cyclo C_3–C_6 alkyl or cyclopropylmethyl group; R_4 is hydrogen or a halogen atom, methyl or ethyl group; R_5 is allyl, propargyl, 3-butenyl, 3-butynyl, phenyl or benzyl group; and A is a —CH=CH— group.

9. An insecticidal and/or acaricidal composition comprising an insecticidally or acaricidally effective amount of a compound according to claim 1 and an inert carrier.

10. A method for killing insects or acarids which comprises applying thereto an insecticidally and/or acaricidally effective amount of a compound according to claim 1.

4,091,112

BIOLOGICALLY ACTIVE AMIDES

Eugene M. Grivsky, Chapel Hill, N.C., assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.

Division of Ser. No. 596,653, Jul. 17, 1975, Pat. No. 4,041,071. This application Jan. 31, 1977, Ser. No. 764,226

Claims priority, application United Kingdom, Aug. 9, 1974, 35279/74

Int. Cl.[2] A61K *31/165*

U.S. Cl. 424—324 **23 Claims**

1. The method of treating or preventing convulsions in a mammal which has had convulsions in the past which com-

prises administering to said mammal an effective non-toxic anti-convulsant amount of a compound trans 3-bromo-N-ethyl-cinnamamide.

4,091,113
RANDOMLY TERMINATED CAPPED POLYMERS

Harold A. Green, Havertown, Pa.; John J. Merianos, Jersey City, and Alfonso N. Petrocci, Glen Rock, both of N.J., assignors to Kewanee Industries, Inc., Bryn Mawr, Pa.

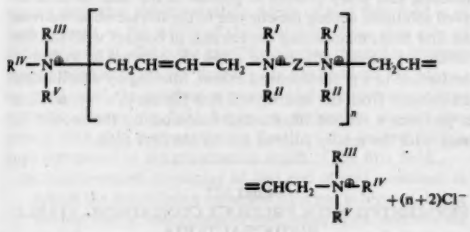
Continuation-in-part of Ser. No. 610,168, Sep. 4, 1975, Pat. No. 4,027,020, which is a continuation-in-part of Ser. No. 518,596, Oct. 29, 1974, Pat. No. 3,931,319. This application Apr. 20, 1977, Ser. No. 789,447

The portion of the term of this patent subsequent to May 31, 1994, has been disclaimed.

Int. Cl.[2] **A01N** *9/20, 9/24;* **C07C** *87/28, 87/10*

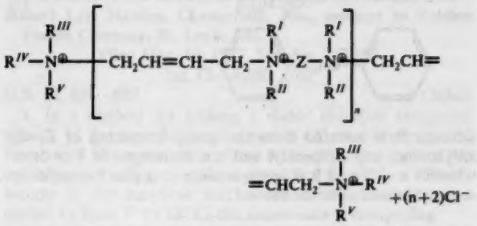
U.S. Cl. 424—329 **6 Claims**

1. A polymeric quaternary ammonium compound and mixtures thereof of formula:



wherein Z represents either (1) a divalent aliphatic radical of from 2 to 10 carbon atoms containing from 0 to 2 hydroxyl substituents and from 0 to 2 ethylenic double bonds, and R^I and R^{II} may either be (A) the same or different and may be either (a) an alkyl group of from 1 to 20 carbon atoms having from 0 to 2 hydroxyl substituents, (b) benzyl, (c) benzyl in which the benzene moiety has one alkyl substituent of from 2 to 20 carbon atoms, or (d) benzyl in which the benzene moiety has from 1 to 5 methyl substituents; (B) R^I and R^{II}, taken together with N, form a saturated or unsaturated heterocyclic ring of from 5 to 7 atoms; or (C) R^I and R^{II}, taken together with N, and combined with an oxygen atom form a N-moropholino group; or (2) Z represents two divalent ethylene radicals, in which case R^{II} is absent and R^I represents (a) an aliphatic radical of from 1 to 20 carbon atoms having from 0 to 2 hydroxyl substituents, (b) benzyl, (c) benzyl in which the benzene moiety has an alkyl substituent of from 2 to 20 carbon atoms; or (d) benzyl in which the benzene moiety has from 1 to 5 methyl substituents; or (3) Z represents three divalent ethylene radicals in which case R^I and R^{II} are both absent; where (1) R^{III} is an aliphatic radical of from 1 to 20 carbon atoms, having from 0 to 2 hydroxyl substituents, and R^{IV} and R^V may either be (a) the same or different and represent an aliphatic radical having from 1 to 4 carbon atoms with from 0 to 1 hydroxyl substituents (b) taken together with N to form a saturated or unsaturated heterocyclic ring of from 5 to 7 atoms; (c) taken together with N, and combined with an oxygen atom to form a N-morpholino group; or where (2) R^{III}, R^{IV}, R^V and N, taken together, represent quinoline, isoquinoline or hexamethylene tetramine; and n is a number of from 1 to 15.

3. The method of conditioning hair which comprises applying to the hair a conditioningly effective amount of an antimicrobial polymeric quaternary ammonium compound or of a mixture of such compounds, said compound having the formula:



wherein Ż represents either (1) a divalent aliphatic radical of from 2 to 10 carbon atoms containing from 0 to 2 hydroxyl substituents and from 0 to 2 ethylenic double bonds, and R^I and R^{II} may either be (A) the same or different and may be either (a) an alkyl group of from 1 to 20 carbon atoms having from 0 to 2 hydroxyl substituents, (b) benzyl, (c) benzyl in which the benzene moiety has one alkyl substituent of from 2 to 20 carbon atoms, or (d) benzyl in which the benzene moiety has from 1 to 5 methyl substituents; (B) R^I and R^{II}, taken together with N, form a saturated or unsaturated heterocyclic ring of from 5 to 7 atoms; or (C) R^I and R^{II}, taken together with N, and combined with an oxygen atom, form a N-moropholino group; or (2) Z represents two divalent ethylene radicals, in which case R^{II} is absent and R^I represents (a) an aliphatic radical of from 1 to 20 carbon atoms having from 0 to 2 hydroxyl substituents, (b) benzyl, (c) benzyl in which the benzene moiety has an alkyl substituent of from 2 to 20 carbon atoms; or (d) benzyl in which the benzene moiety has from 1 to 5 methyl substituents; or (3) Z represents three divalent ethylene radicals in which case R^I and R^{II} are both absent; where (1) R^{III} is an aliphatic radical of from 1 to 20 carbon atoms, having from 0 to 2 hydroxyl substituents, and R^{IV} and R^V may either be (a) the same or different and represent an aliphatic radical having from 1 to 4 carbon atoms with from 0 to 1 hydroxyl substituents (b) taken together with N to form a saturated or unsaturated heterocyclic ring of from 5 to 7 atoms; (c) taken together with N, and combined with an oxygen atom, to form a N-morpholino group; or where (2) R^{III}, R^{IV}, R^V and N, taken together, represent quinoline, isoquinoline or hexamethylene tetramine; and n is a number of from 1 to 15.

4,091,114
PHARMACEUTICALLY ACTIVE 2-OMEGA-AMINOALKOXYDIPHENYLMETHANES

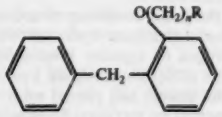
Ryoji Kikumoto, Machida; Akihiro Tobe, Kawasaki; Shinji Tonomura, Tokyo, and Hidenobu Ikoma, Kawasaki, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 612,006, Sep. 10, 1975, abandoned. This application Jul. 9, 1976, Ser. No. 703,978

Int. Cl.[2] **C07C** *93/06;* **A61K** *31/13*

U.S. Cl. 424—330 **12 Claims**

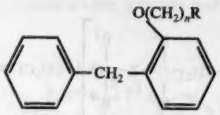
1. A compound having the formula (I):



(I)

wherein R is selected from the group consisting of C_1–C_3 alkylamino, and 1-piperidyl and n is an integer of 4 or 5; or a pharmaceutically acceptable acid addition salt thereof.

8. A method for palliating conditions of depression in warm-blooded animals which comprises administering to said animal an antidepressant effective amount of a compound of the formula (I):



(I)

wherein R is selected from the group consisting of C_1–C_5 alkylamino, and 1-piperidyl and n is an integer of 4 or 5; or wherein $n = 3$ and R is methylamino; or a pharmaceutically acceptable acid addition thereof.

4,091,115

7-AMINO-BENZOCYCLOHEPTENES

Lucien Nedelec, Le Raincy; André Pierdet, Noisy-le-Sec; Claude Dumont, Nogent-sur-Marne, and Marie-Helene Kanneng-iesser, Paris, all of France, assignors to Roussel Uclaf, Paris, France

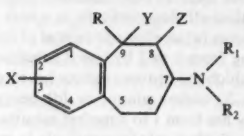
Filed Jul. 26, 1976, Ser. No. 708,749

Claims priority, application France, Jul. 28, 1975, 75 23499

Int. Cl.[2] A61K *31/135;* C07C *87/45*

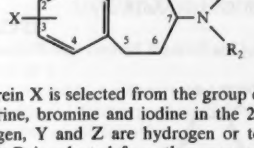
U.S. Cl. 424—330 **19 Claims**

1. A compound selected from the group consisting of 7-amino-benzocycloheptenes of the formula



wherein X is selected from the group consisting of hydrogen, chlorine, bromine and iodine in the 2- or 4-position when a halogen, Y and Z together form a double bond, R is selected from the group consisting of hydrogen, alkyl of 1 to 5 carbon atoms, phenyl and phenyl substituted with a fluorine, chlorine, methyl or methoxy, R_1 is selected from the group consisting of hydrogen, alkyl of 1 to 5 carbon atoms and alkenyl of 2 to 5 carbon atoms and R_2 is selected from the group consisting of alkyl of 1 to 5 carbon atoms and alkenyl of 2 to 5 carbon atoms and R_1 and R_2 taken together with the nitrogen atom to which they are attached form a member selected from the group consisting of pyrrolidino, N-ethyl-piperidino, morpholino, piperazinyl, N-methyl-piperazinyl, N-ethyl-piperazinyl, N-propyl-piperazinyl and N-butyl-piperazinyl and their non-toxic, pharmaceutically acid addition salts.

12. An antidepressive composition comprising an antidepressively effective amount of at least one compound selected from the group consisting of 7-aminobenzocycloheptenes of the formula



wherein X is selected from the group consisting of hydrogen, chlorine, bromine and iodine in the 2- or 4-position when a halogen, Y and Z are hydrogen or together form a double bond, R is selected from the group consisting of hydrogen, alkyl of 1 to 5 carbon atoms, phenyl and phenyl substituted with a fluorine, chlorine, methyl or methoxy, R_1 is selected from the group consisting of hydrogen, alkyl of 1 to 5 carbon atoms and alkenyl of 2 to 5 carbon atoms and R_2 is selected from the group consisting of alkyl of 1 to 5 carbon atoms and alkenyl of 2 to 5 carbon atoms and R_1 and R_2 taken together with the nitrogen atom to which they are attached form a member selected from the group consisting of pyrrolidino, N-ethyl-piperidino, morpholino, piperazinyl, N-methyl-piperazinyl, N-ethyl-piperazinyl, N-propyl-piperazinyl and N-butyl-piperazinyl and their non-toxic, pharmaceutically acid addition salts and an inert pharmaceutical carrier.

4,091,116

ADJUSTING THE PROPORTION OF A SUBSTANCE BY ENZYME TREATMENT

Ronald Alexander Nixon Edwards, 56 Saunders Bay Road, Caringbah, New South Wales; Peter Morris Cantrell, 722 Anzac Parade, Kensington, New South Wales, and John James Miller, 2 Paradise Avenue, Roseville, New South Wales all of Australia

Continuation of Ser. No. 590,588, Jun. 26, 1975, abandoned, which is a continuation of Ser. No. 428,802, Dec. 29, 1973, abandoned. This application Nov. 8, 1976, Ser. No. 739,746

Claims priority, application Australia, Jan. 17, 1973, 1940/73

Int. Cl.[2] A23C *9/12*

U.S. Cl. 426—42 **2 Claims**

1. A process for reducing the proportion of lactose in a composition selected from the group consisting of milk and milk derived solutions using the soluble enzyme β-galactosidase comprising the steps of filtering in a first filter by ultrafiltration from said composition substantially all matter having a molecular size larger than the enzyme including fat, casein micelles, and whey protein as present in the milk or milk derived solutions, adding the enzyme to the filtrate obtained from the first filter, maintaining the enzyme in contact with the first filtrate for a time sufficient to allow the enzyme to hydrolyse the lactose to a predetermined extent, filtering by ultafiltration the enzyme from the hydrolysed first filtrate in a second filter to produce a second filtrate and recombining the second filtrate with the matter filtered out by the first filter.

4,091,117

FERMENTED MILK PRODUCT CONTAINING VIABLE BIFIDOBACTERIA

Masahiko Mutai, Higashi Yamato; Mitsuo Mada, Kodaira; Kei Nakajima, Fuchu; Shusei Takahashi, Higashi Murayama; Takashi Nakao, Hoya; Kiyohiro Shimada, and Takashi Iijima, both of Kunitachi, all of Japan, assignors to Kabushiki Kaisha Yakult Honsha, Tokyo, Japan

Filed Oct. 26, 1976, Ser. No. 735,413

Claims priority, application Japan, Jan. 1, 1976, 51-296

Int. Cl.[2] A23C *9/12*

U.S. Cl. 426—43 **1 Claim**

1. A method for producing fermented milk containing viable bifidobacteria, which comprises cultivating Bifidobacterium bifidum YIT-4005 in a medium consisting of reconstituted milk, milk whey, whole milk or skim milk.

4,091,118

PROCESS FOR THE PRODUCTION OF A VEGETABLE-BASED SWEETENED CONDENSED MILK

Olivier de Rham, Vevey, Switzerland, assignor to Societe d'Assistance Technique Pour Produits Nestle S.A., Lausanne, Switzerland

Filed Nov. 4, 1976, Ser. No. 738,878

Claims priority, application Switzerland, Sep. 28, 1976, 12244/76

Int. Cl.[2] A23C *11/00;* A23L *1/20*

U.S. Cl. 426—46 **7 Claims**

1. A process for the production of a vegetable-based sweetened condensed milk which comprises subjecting a vegetable protein in the form of an aqueous solution or suspension to enzymatic hydrolysis to enzymatically digest a portion of said protein, said enzymatically hydrolysed proteins in suspension or solution being subjectd to partial precipitation to separate undigested protein from digested protein and said undigested protein being eliminated after the enzymatic hydrolysis step, and thereafter preparing a mixture containing approximately 4 to 9 parts by weight of fats, 8 to 18 parts by weight of said digested protein, 0 to 14 parts by weight of lactose, 40 to 55

parts by weight of sucrose and 25 to 32 parts by weight of water.

4,091,119

METHOD FOR UNIFORM HEATING OF A FOODSTUFF FOR PRESERVATION AND APPARATUS THEREFOR

Jean Bach, 19, Waldstrasse, Grafelfing, Germany (D-8032)

Filed May 6, 1977, Ser. No. 794,521
Claims priority, application Germany, May 13, 1976, 2621312
Int. Cl.[2] A23L *3/00*
U.S. Cl. 426—234 27 Claims

1. In a method for effecting a uniform heating, particularly for the purpose of preserving of an organic product located in a container in which a gas occupies the space inside the container above the product, and comprising the steps of immersing the container into a liquid having a low dielectric loss factor to such an extent that the liquid level is somewhat below the upper surface of the product in the container, using electrodes located to either side of the container to pass through the container from one side to the other a first high-frequency electromagnetic alternating field having a respective first frequency such that the penetration depth of said first field is at least as great as the width of the container; from that side of said container at which the gas filled portion thereof is located, passing into the container through the gas and into the adjoining portion of the product a second high-frequency electromagnetic alternating field having a respective second frequency such that the penetration depth of the second field is small compared to the penetration depth of the first field,

the improvement consisting of that end of said container at which the space being occupied by a gas is located, being the top end of said container and being open, said second high-frequency electromagnetic alternating field being introduced through said open top end of said container.

4,091,120

LIQUID DIETARY PRODUCT CONTAINING SOY PROTEIN MEMBRANE ISOLATE

Kenneth C. Goodnight, Jr.; Grant H. Hartman, Jr., both of Evansville, Ind., and Robert F. Marquardt, Dublin, Calif., assignors to Mead Johnson & Company, Evansville, Ind.

Filed Nov. 15, 1976, Ser. No. 741,811
Int. Cl.[2] A23L *1/20, 2/00*
U.S. Cl. 426—598 32 Claims

1. The process for preparing a liquid dietary product containing soy protein as principle protein ingredient which comprises

(a) forming an aqueous solution of soy protein at a pH in excess of the isoelectric value of said soy protein but less than pH 10, said soy protein being obtained by aqueous extraction of defatted particulate soybean at a pH in excess of the isoelectric value of the soy protein;

(b) separating insoluble material from said solution to yield a clarified extract containing dissolved protein and dissolved carbohydrate;

(c) separating carbohydrate from said clarified extract by filtration employing a semi-permeable membrane which has the capability to retain dissolved protein as retentate and to pass dissolved carbohydrate as permeate; and

(d) combining said retentate containing dissolved protein with additional nutritional ingredients to form a liquid dietary product, said liquid dietary product having improved nutritional value and physical stability relative to a similar product prepared from dried or precipitated soy protein isolate.

4,091,121

METHOD FOR MAKING IMITATION MARGARINE

Robert Lyle Hawley, Chesterfield, Mo., assignor to Ralston Purina Company, St. Louis, Mo.

Filed Mar. 14, 1977, Ser. No. 777,208
Int. Cl.[2] A23D *3/02*
U.S. Cl. 426—603 3 Claims

1. In a method for making a stable imitation margarine spread, of the type having a water-in-oil emulsion prepared from an oil phase comprising from 40 to 60% by weight of the emulsion and an aqueous phase providing from 60 to 40% by weight of the emulsion said emulsion being kneaded and cooled to from 7° to 13° C; the improvement comprising:

(a) preparing the aqueous phase at a pH of from 4.8 to 5.8 with from 4 to 10% by weight of the aqueous phase being a spray dried vegetable protein isolate having a pH of 6.6 to 7.0 prior to admixture with the aqueous phase;

(b) preparing the emulsion from said aqueous phase and said oil phase heated at from 50° to 100° C;

whereby phase inversion to an oil-in-water emulsion and syneresis upon spreading are substantially inhibited and the need to form the emulsion at high pH is negated without employing animal protein.

4,091,122

PROCESS FOR PRODUCING PRESSURE-SENSITIVE COPY SHEETS USING NOVEL RADIATION CURABLE COATINGS

Gerald Titus Davis, and Dale Richard Shackle, both of Chillicothe, Ohio, assignors to The Mead Corporation, Dayton, Ohio

Filed May 7, 1976, Ser. No. 684,462
Int. Cl.[2] B05D *3/06*
U.S. Cl. 427—44 14 Claims

1. A process for producing a pressure-sensitive carbonless record sheet comprising the steps of:

(a) preparing a liquid chromogenic coating composition by mixing a color developing material with a liquid radiation curable substance, said color developing material being an acidic electron acceptor, said liquid radiation curable substance including one or a mixture of ethylenically unsaturated organic compounds having at least one terminal ethylenic group per molecule, said liquid radiation curable substance being compatible with the color forming characteristics of said color developing material;

(b) coating said liquid chromogenic coating composition on a substrate, said coating being applied at a coat weight of from about 0.2 pounds to about 8.0 pounds per 3300 square feet of said substrate; and

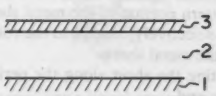
(c) exposing said coated substrate to radiation for a period of time sufficient to cure said liquid coating composition to a tack-free film, said tack free film being compatible with the color forming characteristics of said color developing material.

4,091,123

METHOD FOR THE MANUFACTURE OF A STEEL SHEET HAVING EXCELLENT LUBRICATING PROPERTY

Saburo Ayusawa; Takeo Nagashima, and Masaya Tsutsumi, all of Kimitsu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Jun. 14, 1976, Ser. No. 696,037
Int. Cl.[2] B44D *1/50*
U.S. Cl. 427—44 6 Claims



1. A method for manufacturing a steel sheet having an anti-

galling lubricative coating effective during severe press working thereof which comprises applying to a surface of a steel sheet a layer of a liquid coating composition whose main constituent is selected from the group of monomers and polymers that become solid when cured by irradiating with ionizing radiant energy in an oxygen-free environment but remain at least semi-liquid when the molecules thereof are contacted by oxygen while so irradiated, and subjecting said layer to irradiation with ionizing radiant energy while the exposed surface of said layer is in contact with an oxygen bearing atmosphere until a layer of said coating composition in contact with said sheet has become cured and solid while a surface layer of said composition on said cured layer has reacted with said oxygen and remains in said semi-liquid state.

4,091,124

METHOD OF PRODUCING AN IMPROVED CONCRETE ELECTRICAL INSULATOR

David H. Reighter, Roslyn, Pa., assignor to Gould Inc., Rolling Meadows, Ill.

Filed Apr. 21, 1976, Ser. No. 679,057
Int. Cl.² B05D 5/12, 1/18
U.S. Cl. 427—58 **10 Claims**

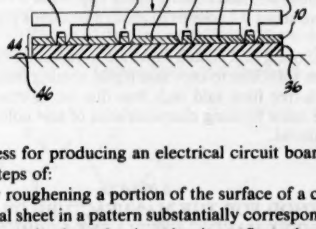
1. A method of producing an improved polymer containing concrete electrical insulator which comprises (a) immersing a self-supporting concrete body comprising a mixture of cement and aggregate, which has curable resin bath, (b) curing said polymer while immersed in said bath under conditions such that the entire resin bath does not also cure, (c) separating said body from said resin bath, and then (d) curing said resin so as to form a secondary sealant of the porosity of said body caused by the shrinkage of said uncured polymer as it cures.

4,091,125

CIRCUIT BOARD AND METHOD FOR PRODUCING SAME

Joseph A. Delgadillo, 16326 Burneston, Granada Hills, Calif. 91344

Filed Nov. 8, 1976, Ser. No. 739,608
Int. Cl.² B05D 5/12, 1/32, 3/02
U.S. Cl. 427—96 **15 Claims**



1. A process for producing an electrical circuit board comprising the steps of:

selectively roughening a portion of the surface of a conductive metal sheet in a pattern substantially corresponding to a pre-determined conductive circuit configuration which roughened surfaces renders the pattern portion essentially adherent to a resin;

placing the roughened pattern portion of the metal sheet in direct contact with a uniform layer of resin on the surface of an insulating substrate to form an assembly;

heating the assembly to an elevated temperature to soften the resin such that the resin wets and adheres to the roughened pattern portion of the metal sheet whereby the substrate is selectively bonded to the roughened pattern portion of the metal sheet;

punch cutting the sheet along the perimeter of the pattern portions; and

stripping the non-pattern portions of the metal sheet from the substrate to form a conductive circuit board.

4,091,126

METHOD OF DYEING A PATTERN LIKE THE GRAIN OF WOOD ON THE SURFACE OF AN ALUMINUM

Hiroshi Hidan, Kashiwa, Japan, assignor to Kabushiki Kaisha Hidan Seisakusho, Japan

Filed Mar. 5, 1976, Ser. No. 664,382
Int. Cl.² B05D 1/36, 5/00
U.S. Cl. 427—262 **5 Claims**

1. A method of dyeing a pattern resembling wood grain upon the surfaces of formed blanks of anodic oxide film-coated aluminum or alloys thereof which comprises the steps of depositing in a patterned manner unto the surface of the water on a water tank an oily coloring composition containing an oil dye, a vehicle therefore and a solvent, said solvent being selected from the group consisting of a water soluble organic solvent and one or more of an oil group long chain fatty acid and a long chain alcohol; contacting said formed blank with the water surface bearing said deposited composition to transfer the deposited patterned oily composition from said surface to said anodic oxide film on said blank.

4,091,127

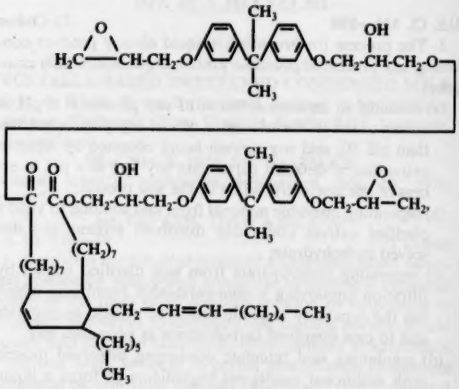
CURED EPOXY POLYMER HAVING IMPROVED ADHESIVE PROPERTIES

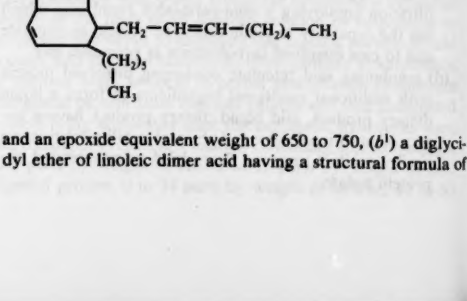
Charles Allen McPherson, Eastampton Township, Burlington County, N.J., assignor to Western Electric Company, Inc., New York, N.Y.

Continuation of Ser. No. 642,202, Dec. 19, 1975, abandoned, which is a division of Ser. No. 465,376, May 1, 1974, abandoned, which is a continuation-in-part of Ser. No. 443,648, Feb. 19, 1974, abandoned, which is a continuation-in-part of Ser. No. 369,038, Jun. 11, 1973, abandoned. This application Nov. 1, 1976, Ser. No. 737,639
Int. Cl.² B05D 5/10; C08L 63/00; C23C 3/02
U.S. Cl. 427—304 **10 Claims**

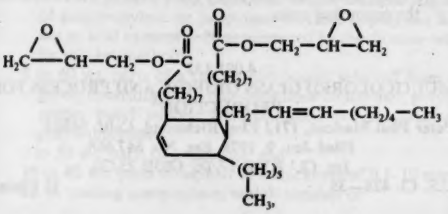
1. A method of depositing an adherent metal deposit on a surface comprising a fully cured epoxy existing in a virgin state comprising the steps of:

coating a surface of a suitable substrate with a reaction mixture comprising (1) a resin component which comprises (a) *x* parts by weight per 100 parts by weight of the resin component of a diglycidyl ether based upon linoleic dimer acid selected from the group consisting of (a^1) an adduct of two moles of the diglycidyl ether of bisphenol A and one mole of linoleic dimer acid having a structural formula of

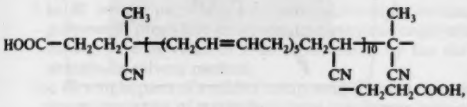




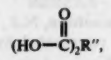
and an epoxide equivalent weight of 650 to 750, (b^1) a diglycidyl ether of linoleic dimer acid having a structural formula of



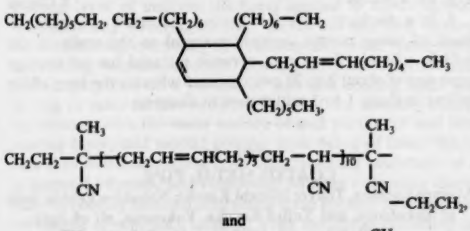
and an epoxide equivalent weight of 400 to 420, and(c^1) a mixture thereof; (b) y parts by weight per 100 parts by weight of the resin component of an elastomerically modified epoxy resin blend comprising the reaction product of about 40 weight percent of a carboxyl terminated acrylonitrile/butadiene random copolymer having a structural formula of



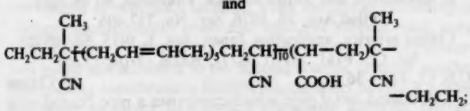
containing 2.37 percent carboxyl groups, 18 to 19 percent bound acrylonitrile and having a number average molecular weight of 3200, combined with about 60 weight percent of a diglycidyl ether selected from the group consisting of a diglycidyl ether of bisphenol A having an epoxide equivalent weight of 180 to 195 and a diglycidyl ether of bisphenol F having an epoxide equivalent weight of 152 to 167; and (c) z parts of a suitable diglycidyl ether selected from the group consisting of a diglycidyl ether of bisphenol A, a diglycidyl ether of bisphenol F and a mixture thereof where $x + y + z = 100$ parts and z is a concentration less than 100 parts by weight; and (2) a suitable curing agent selected from (a) an acid anhydride present in an amount ranging from about 16 to about 60 parts by weight per 100 parts by weight of the resin component, (b) a suitable polyamine present in an equal mole-to-mole ratio with the resin component, (c) a mixture comprising said polyamine in (b) above combined with at least 5 parts by weight per 100 parts by weight of the resin component of a suitable acid anhydride, (d) a mixture comprising said acid anhydride in (a) above combined with up to about 30 parts by weight per 100 parts by weight of the resin component of a carboxylic acid selected from the group consisting of a dicarboxylic acid having a structural formula of



where R" is an organic radical selected from



and



and a trimer acid having a stoichiometry of $C_{54}H_{96}O_6$, and a mixture thereof, and (e) a mixture of the foregoing;

curing the mixture to obtain a fully cured epoxy coated surface;

rendering said fully cured epoxy coated surface capable of having a electroless metal deposited thereon from an electroless metal plating solution without a prior hydrophilic rendering pretreatment thereof; and

treating said rendered surface with an electroless metal plating solution to deposit a metal thereon.

4,091,128

ELECTROLESS GOLD PLATING BATH

Helmut Franz, Pittsburgh, and James C. Vanek, New Kensington, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Oct. 8, 1976, Ser. No. 731,053
Int. Cl.² C23C *3/02*
U.S. Cl. 427—304 **9 Claims**

1. In a method for preparing a gold film on a non-metallic substrate comprising the steps of sensitizing and activating a surface of the substrate and contacting the activated surface with an aqueous solution of a gold salt and a complexing agent in the presence of a reducing agent, the improvement which comprises preparing the aqueous solution of a gold salt and a complexing agent by

(a) adding the gold salt to a volume of water substantially less than half the desired final volume of the aqueous solution but sufficient to dissolve the gold salt;

(b) adding the complexing agent to a volume of water substantially less than half the desired final volume of the aqueous solution but sufficient to dissolve the complexing agent;

(c) adding the solution prepared in (a) to the solution prepared in (b);

(d) diluting the aqueous solution prepared in (c) to the desired final volume; and

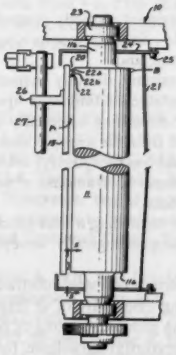
(e) heating a solution comprising the complexing agent to substantially accelerate the complexation reaction.

4,091,129

METHOD AND APPARATUS FOR COATING USING AN OPEN-ENDED INK CHAMBER HAVING RESTRICTIONS FOR PARTIALLY LIMIT INK FLOW

Edwin K. Schaeuble, Green Bay, Wis., assignor to Paper Converting Machine Company, Green Bay, Wis.

Filed May 16, 1977, Ser. No. 797,459
Int. Cl.² B05D *1/28*
U.S. Cl. 427—345 **11 Claims**



1. In a method for applying a liquid coating to a moving web by applying ink to a rotating roll for transfer to said web, the steps of introducing a coating liquid generally centrally of a

horizontally elongated chamber having said roll mounted for rotation therein while positioning a vertical chamber wall closely adjacent to said roll, said wall adjacent the bottom thereof being equipped with a doctor blade for metering liquid to said roll, the improvement comprising applying said coating liquid to said web while partially restricting the flow of liquid horizontally along said wall slightly inward of the ends of said roll to provide a substantially uniform liquid level in contact with said roll along the length thereof while avoiding both foaming of liquid and fouling the roll end faces said partially restricting including the positioning of barrier inserts at least about 2mm away from the ink applying surface of said roll collecting the liquid flowing past said roll ends and reintroducing the same into said chamber.

4,091,130

METHOD FOR OBTAINING CONTROLLED CURE IN THE COATING OF PAPERS

Michael J. Shaw, Kalamazoo, Mich., assignor to Allied Paper Incorporated, Kalamazoo, Mich.

Filed Jun. 21, 1976, Ser. No. 698,466
Int. Cl.[2] B41M *5/22*; D06M *13/14*
U.S. Cl. 427—358 **16 Claims**

1. A method for the preparation of coated paper having a cured binder coating comprising the steps of

applying to said paper a coating formulation comprising on a dry basis at least about 5% by weight of a reactive polymer having reactive carboxyl, hydroxyl or amido groups, an aminoplast cross-linking agent and a curing accelerator catalyst wherein either or both the accelerator and cross-linking agent are encapsulated in microcapsules;

the amount of cross-linking agent being in the range of about 1:50–1:2 based on the weight of reactive polymer;

the amount of accelerator catalyst being in the range of about 0.1:100–3:100 based on the weight of reactive polymer;

subjecting said paper to the successive steps of drying and calendering;

said microcapsules being ruptured in the calendering step to achieve a controlled cure of the binder coating in such step.

4,091,131

NONPERISHABLE DIRECT ENAMELING STEEL AND METHOD FOR PRODUCING SAME

Guido A. Perfetti, Bethlehem, Pa., assignor to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Sep. 19, 1975, Ser. No. 615,026
Int. Cl.[2] B05D *1/36, 7/14*; B32B *15/04*
U.S. Cl. 427—386 **16 Claims**

1. A corrosion resistant, directly enamelable and pharmacologically acceptable composite comprising:

(a) a steel substrate; and

(b) a corrosion resistant, directly enamelable and pharmacologically acceptable coating layer upon the surface of the steel substrate consisting essentially of at least one compound selected from the group consisting of pentaerythrityl dioleate and pentaerythrityl tetraoleate, the coating layer being present in an amount of not greater than about 15 grams per base box.

11. A process for enameling a steel substrate having a corrosion resistant, pharmacologically acceptable coating layer comprising:

(a) coating the surface of a steel substrate with a first coating layer consisting essentially of at least one compound selected from the group consisting of pentaerythrityl dioleate and pentaerythrityl tetraoleate, the coating layer being present in an amount of not greater than about 15 grams per base box;

(b) applying a second layer comprised of enameling resin over the first coating layer; and

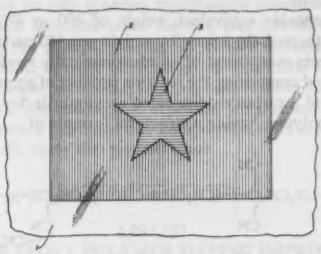
(c) heating the coated steel substrate from step (b) to harden the enameling resin.

4,091,132

MULTICOLORED GLASS OBJECTS AND PROCESS FOR PRODUCTION

Peter Paul Marioni, 1712 Elm, Richmond, Calif. 94805

Filed Jan. 9, 1976, Ser. No. 647,668
Int. Cl.[2] B32B *17/06*; C03B *23/20*
U.S. Cl. 428—35 **11 Claims**



1. A process for forming a continuous, smooth-surfaced, multicolored glass object comprising:

A. forming a gather of glass at a temperature at which it can be blown,

B. blowing an initial hollow object from the gather,

C. placing a colored pattern piece in contact with the surface of the initial object while said initial object is at a temperature at which it can be blown,

D. maintaining the pattern piece in contact with the surface of the initial object for a time sufficient for the pattern piece to reach a temperature at which it can be blown, and

E. blowing the initial hollow object only to the extent to produce a second hollow object having said pattern piece integral therewith and said second hollow object having a size and shape such that said pattern piece has a predetermined shape which is not substantially distorted from the original shape of said pattern piece.

8. An article comprising a continuous, smooth-surfaced, glass membrane including an integral colored pattern and made by the process of claim 1.

4,091,133

POROUS CERAMIC TUBING FOR FLOWING GAS LASERS

Aristotle Papayoanou, Eatontown, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 3, 1975, Ser. No. 637,246
Int. Cl.[2] F16L *9/08*
U.S. Cl. 428—36 **5 Claims**

1. In a discharge tube for flowing gas lasers, the improvement of using porous ceramic material as the walls of the tubing, wherein the porous ceramic material has an average pore size of about 2 to 20 microns, and wherein the bore of the tubing is about 1 to 3 millimeters in diameter.

4,091,134

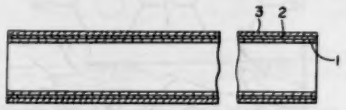
COATED METAL PIPE

Masaru Uemura, Tokyo; Hitoshi Kuroki; Nobuhiro Echida, both of Yokohama, and Yujiro Kosaka, Yokosuka, all of Japan

Filed Aug. 24, 1976, Ser. No. 717,406
Claims priority, application Japan, Sep. 1, 1975, 50-105785
Int. Cl.[2] F16L *58/10, 58/12*; B32B *15/04, 15/08*
U.S. Cl. 428—36 **13 Claims**

1. A coated metal pipe which comprises a pipe coated with a composition consisting of:

2 to 40 wt. parts of a low molecular weight oxidized polymer of polypropylene or propylene-ethylene copolymer having an acid value of 1–20 as measured by the dioxane-tetralin solvent method;
5 to 40 wt. parts of a rubber component selected from the group consisting of styrene-butadiene copolymer, polyisoprene, butyl rubber, chlorosulfonic polyethylene and polyisobutylene;
5 to 50 wt. parts of a tackifier; and
10 to 80 wt. parts of asphalt to a thickness of 0.1–10 mm.
10. A coating composition, which consists of:



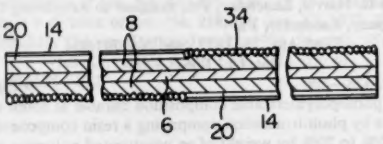
2 to 40 weight parts of a low molecular weight oxidized polymer of propylene or a propylene-ethylene copolymer having an acid value of 1–20 as measured by the dioxanetetralin solvent method;
5 to 40 weight parts of a rubber component selected from the group consisting of styrenebutadiene copolymer, polyisoprene, butyl rubber, chlorosulfonic polyethylene and polyisobutylene;
5 to 50 weight parts of a tackifier; and
10 to 80 weight parts of asphalt.

4,091,135

LAMINATED BITUMINOUS ROOFING MEMBRANE

Eiichi Tajima; Kaname Yamamoto, and Takayoshi Imai, all of Tokyo, Japan, assignors to Tajima Roofing Co., Ltd., Tokyo, Japan

Division of Ser. No. 575,540, May 8, 1975, Pat. No. 4,039,706, which is a division of Ser. No. 331,602, Feb. 12, 1973, abandoned.
This application May 12, 1977, Ser. No. 796,132
Claims priority, application Japan, Feb. 19, 1972, 47-016906
Int. Cl.² B32B *3/00, 11/00*
U.S. Cl. 428—40 **15 Claims**



1. A self-adhesive, multi-layer, laminated, bituminous roofing membrane, comprising a flexible base sheet having superposed on the entirety of at least one surface thereof a first coating layer of uniform thickness applied in direct face-to-face, mutually adhering contact therewith, said first coating layer consisting essentially of a substantially solid, waterproofing roofing bitumen; a second coating layer of uniform thickness surperposed on a portion of said first coating layer and having its inner surface in direct, face-to-face, mutually cohering contact with the outer surface of said portion of said first coating layer, said second coating layer being of lesser thickness than said first coating layer and consisting essentially of a compound bitumen, said compound bitumen consisting essentially of roofing bitumen containing from about 5 to 95 percent by weight of substance selected from the group consisting of rubber, thermoplastic resin and mixtures thereof, said compound bitumen being of high tackiness at ambient temperature and being self-adhesive to the second coating layer of another like roofing membrane; a flexible release sheet having a release substance in direct face-to-face releasably adhering contact with the entire outer surface of said coating layer, said release sheet being an exposed outer layer of said roofing membrane, said second layer having been adhered in a molten state to said portion of said first coating layer; and the remainder of said first coating layer being covered by a layer of mineral granules, a synthetic polymer film or a metal foil directly adhered to the remainder of said first coating layer.

4,091,136

SYNTHETIC CORK-LIKE MATERIAL AND METHOD OF MAKING SAME

John C. O'Brien, Clinton, N.J., and Herbert A. Ehrenfreund, Madison, Conn., assignors to Shaw Plastics Corporation, Berkeley Heights, N.J.

Filed May 17, 1976, Ser. No. 686,730
Int. Cl.² B32B *3/26*
U.S. Cl. 428—141 **4 Claims**

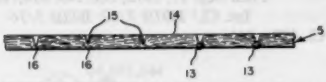
1. Synthetic cork-like stoppers for liquid containers comprising a fine closed cell foam produced by extrusion in rod form of a foamable mixture of polyolefin and a foaming agent together with an ethylene/methacrylic acid copolymer based ionomer resin, the resulting ionomer modified foam rod having a matte outer surface and a substantially uniform density throughout its cross section of from 12 lbs/cu.ft. to 17 lbs/cu.ft. and a non-leveling coating of moisture impervious material impregnating said matte surface, said material having a substantially higher coefficient of friction than the surface of the foam per se.

4,091,137

POROUS NONWOVEN FILM-FIBRIL SHEET HAVING OPTICAL TRANSMISSION PROPERTIES

Philip Eugene Miller, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 236,384, Mar. 20, 1972, abandoned. This application May 3, 1974, Ser. No. 467,093
Int. Cl.² B32B *7/14*
U.S. Cl. 428—198 **5 Claims**



1. A lightweight, abrasion resistant nonwoven film-fibril sheet of thermoplastic polymer embossed over substantially the entire area of at least one surface with a pattern comprising from 50 to 1000 small fused regions per square inch which in the aggregate represent from 3 to 25% of the total area of the surface of the sheet, said embossed regions having an average optical transmission of at least 50%.

4,091,138

INSULATING FILM, SHEET, OR PLATE MATERIAL WITH METALLIC COATING AND METHOD FOR MANUFACTURING SAME

Toshinori Takagi, 23-4, Tomookayashiki, Nagaokakyo-shi, Japan; Tatsuichiro Nishiyama, and Unosuke Uchida, both of Yokohama, Japan, assignors to Sumitomo Bakelite Company Limited, Tokyo and Toshinori Takagi, Nagaokakyo, both of, Japan

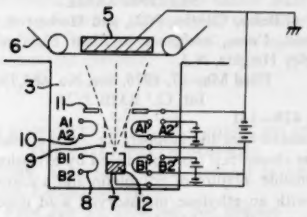
Filed Feb. 4, 1976, Ser. No. 655,233
Claims priority, application Japan, Feb. 12, 1975, 50-16816; Feb. 12, 1975, 50-16817; Feb. 26, 1975, 50-22767; Feb. 26, 1975, 50-22768; Mar. 5, 1975, 50-26077; Mar. 6, 1975, 50-26536; Mar. 25, 1975, 50-34933; Mar. 28, 1975, 50-36886
Int. Cl.² C23C *13/02*
U.S. Cl. 428—209 **11 Claims**

1. A coated material comprising an insulating substrate of polyester of polyimide having on at least one surface a metallic

copper coating deposited from the vapor phase by cluster ion plating, said plating being obtained by

(1) providing a small hole on the top of a crucible containing the copper to be deposited, the diameter of the hole being 1 to 30% of the inner diameter of the crucible,

(2) heating the crucible under vacuum to a temperature at which said copper is sufficiently vaporized to eject the copper vapor from said small hole, thereby forming clusters each being an aggregate of about 1,000 metal atoms,



(3) allowing electrons, generated from a red-hot ionizing heater separately provided by applying a DC voltage between the heater and an ionizing anode, to collide against the clusters, thereby ionizing some of the clusters, and

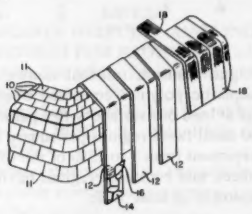
(4) accelerating the ionized clusters by applying a DC voltage sufficiently high to increase adherence of the clusters to the substrate, said accelerating voltage being applied between the ionizing anode and an extraction-electrode, thereby depositing the accelerated ionized clusters together with un-ionized clusters on the insulating substrate.

4,091,139

SEMICONDUCTOR BINDING TAPE AND AN ELECTRICAL MEMBER WRAPPED THEREWITH

James F. Quirk, Wilkins Township, Allegheny County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 17, 1975, Ser. No. 614,716
Int. Cl.² H01B 7/02; B32B 5/16
U.S. Cl. 428—244 **3 Claims**



1. An insulated electrical member, comprising at least one conductor wrapped with mica insulation and covered with a semiconducting binding tape, the whole being impregnated with a cured epoxy-styrene resin; wherein the binding tape comprises a porous, open weave substrate of electrically semiconducting fibrous strands; the fibrous strands coated with between about 15 to 40 weight percent of a carbon filled, completely thermoset, styrene resistant, protective varnish composition, the protective varnish composition consisting essentially of a cured, heat reactive phenolic alkyd admixture of 40 wt% to 75 wt% of a phenolic component and 60 wt% to 25 wt% of an alkyd component; said varnish composition containing between about 15 to 45 weight percent of electrically contacting carbon particles having a total internal and external surface area of up to about 600 square meters/gram, uniformly distributed therethrough, the interior of the carbon being substantially free of the varnish and resin, to provide fibrous strands that conduct electricity, said impregnated binding tape having a resistivity value of up to about 15,000 ohms/-square.

4,091,140

CONTINUOUS FILAMENT NONWOVEN FABRIC AND METHOD OF MANUFACTURING THE SAME

Carlyle Harmon, Provo, Utah, assignor to Johnson & Johnson, New Brunswick, N.J.

Filed May 10, 1976, Ser. No. 684,687
Int. Cl.² D04H 1/58
U.S. Cl. 428—288 **14 Claims**

1. A new nonwoven fabric comprising a layer of substantially continuous, randomly disposed, filaments, a portion of said filaments being at least partially molecularly oriented, crystalline, synthetic polymer and another portion of said filaments being electron beam radiation cross-linked polymerized materials selected from the class consisting of the unsaturated polyester polymers, the unsaturated polyurethane polymers, the unsaturated epoxy bis-phenol A resins, modified silicones, unsaturated acrylate copolymers, block copolymers of styrene and butadiene and mixtures thereof, said cross-linked polymerized filaments being bonded to each other and to said molecularly oriented filaments to produce a unitary web.

4,091,141

PHOTOCURABLE ELASTOMERIC POLYESTER COMPOSITION, FIBROUS ARTICLES IMPREGNATED THEREWITH AND METHOD OF MAKING SAME

Thomas G. Harris, Lancaster, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.

Filed Apr. 28, 1977, Ser. No. 791,834
Int. Cl.² B05D 3/06
U.S. Cl. 428—290 **9 Claims**

1. A photopolymerizable composition curable at room temperature by photoirradiation comprising a resin component of:

(1) 15% to 50% by weight of an unsaturated polyester resin comprising the reaction product of tetrahydrophthalic anhydride endic anhydride or an aromatic dicarboxylic acid and, a diol having an allyl unsaturated group pendant from the diol chain;

(2) 85% to 50% by weight of a methylolated phenolic cross-linking agent; and, 0.5% to 5.0% by weight based on said resin component of a metal halide, Lewis acid photoinitiator.

6. A method for coating a fibrous web comprising the steps of

(a) contacting the fibrous web with a photopolymerizable composition curable at room temperature by photoirradiation comprising

(1) 15% to 30% by weight of an unsaturated polyester resin having a minimum number average molecular weight of about 2,500 comprising the condensation product of

(a) about 0 to 30 mol percent of phthalic anhydride,

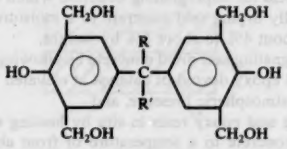
(b) about 20 to 50 mol percent of tetrahydrophthalic anhydride (a) plus (b) totalling 50 mol percent,

(c) about 1 to 10 mol percent of trimethylol propane monoallylether,

(d) about 20 to 50 mol percent by weight of a polyoxyethylene diol having a number average molecular weight of about 400, and

(e) sufficient ethylene glycol to bring the total mol percent of diol reactants to about 50 mol percent where (c) plus (d) total less than 50 mol percent,

(2) 85% to 50% by weight of a methylolated phenolic crosslinking agent of the formula



wherein R and R′ can be the same or different and are hydrogen or C_1 to C_4 linear or branched alkyl; and 0.5% to 5.0% by weight based on said resin component of a metal halide photoinitiator comprising silver chloride, silver bromide, stannic chloride, stannous chloride or titanium tetrachloride,

(b) irradiating the fibrous web of step (a) with actinic light having a wave length below 7,000 angstroms for a time sufficient to photopolymerize said photopolymerizable composition.

4,091,142

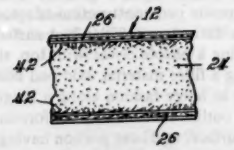
STRUCTURAL PANEL AND METHOD OF MAKING SAME

Richard R. Elmore, and Benjamin M. Couch, both of Herrin, Ill., assignors to Dura-Plex Industries, Inc., Herrin, Ill.

Continuation of Ser. No. 463,275, Apr. 23, 1974, abandoned, which is a division of Ser. No. 218,398, Jan. 17, 1972, Pat. No. 3,846,524. This application Jan. 21, 1976, Ser. No. 650,941

Int. Cl.² B32B *5/20, 5/24, 5/16, 27/40*

U.S. Cl. 428—322 **11 Claims**



1. A structural panel for use in building construction and the like, comprising a core of cured foamed resin composition having a configuration corresponding substantially to the desired shape of the structural panel and including side surfaces, and a side skin sheet integrally secured to each side surface of said core, at least one of said side skin sheets being made of a cured fiber-reinforced resin including a first layer of resin which has reinforcing material to provide increased strength for the sheet, and a second layer of resin on said first layer having a plurality of fibers with portions thereof embedded in said second layer and other portions of the fibers projecting from a surface thereof into and integrally adhering with said foamed core.

4,091,143

MAGNETIC RECORDING MEDIA

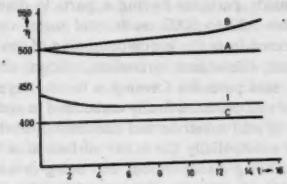
Hans Joerg Hartmann, Freinsheim; Guenter Vaeth, Limburgerhof, and Helmut Kopke, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Continuation of Ser. No. 429,088, Dec. 28, 1973, abandoned. This application Oct. 22, 1975, Ser. No. 624,580

Claims priority, application Germany, Jan. 2, 1973, 2300020

Int. Cl.² H01F *10/02*

U.S. Cl. 428—328 **2 Claims**



1. A magnetic recording media having high orientation ratios which comprises:

(a) a polyethylene terephthalate base film; and

(b) a magnetic coating on said film, said magnetic coating consisting essentially of elongated ferromagnetic chromium dioxide particles dispersed in a synthetic, organic, polymeric binder, the amount of said binder being about 0.13 to 0.5 parts per part by weight of chromium dioxide, said binder further containing from 0.5 to 6% by weight based on the amount of chromium dioxide of zinc oleate.

4,091,144

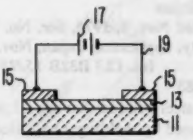
ARTICLE WITH ELECTRICALLY-RESISTIVE GLAZE FOR USE IN HIGH-ELECTRIC FIELDS AND METHOD OF MAKING SAME

Joseph Dresner, Princeton, and Kenneth Warren Hang, East Windsor, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed May 24, 1976, Ser. No. 689,266

Int. Cl.² B32B *17/06;* **H01C** *8/00;* **B32B** *5/16*

U.S. Cl. 428—328 **7 Claims**



1. An article of manufacture comprising a substrate carrying a layer of glaze consisting essentially of

(a) an inorganic oxide glass matrix that is essentially free from ions which migrate in the presence of a highelectric field of 10 kilovolts per centimeter and higher,

(b) about 1×10^{19} to 50×10^{19} antimony cations substantially uniformly distributed in each cubic centimeter of said glass matrix, and

(c) about 4 to 30 weight % with respect to the weight of said glaze of discrete particles of tin oxide in said glass matrix.

4,091,145

SUPPORT FOR ELECTROPHOTOGRAPHIC SENSITIVE PLATE

Katutoshi Endo, and Makoto Ohira, both of Tokyo, Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed Jan. 19, 1976, Ser. No. 650,465
Claims priority, application Japan, Jan. 23, 1975, 50-9961
Int. Cl.[2] B32B 5/16, 15/04
U.S. Cl. 428—546 6 Claims

1. A support for electrophotographic sensitive plate consisting of a metal substrate having directly embedded in its surface fine metal oxide particles having a particle diameter in the range of from 100 to 8000 mesh, said metal oxide being a member selected from the group consisting of oxides of aluminum, titanium, chromium, zirconium, silicon, zinc, iron and magnesium, said particles forming a barrier layer consisting essentially of said particles firmly embedded in and attached to said surface of said substrate and distributed substantially uniformly over substantially the entire surface area thereof, said barrier layer being discontinuous and being dotted by microscopic uncovered portions of said surface of said metal substrate.

4,091,146

FLEXIBLE, LOW POROSITY AIRFOIL SKIN

Kenneth A. Darrow, Sprakers, and Daniel P. Smith, Ballston Spa, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 618,458, Oct. 1, 1975, abandoned. This application May 5, 1977, Ser. No. 793,921
Int. Cl.[2] B32B 15/18
U.S. Cl. 428—594 6 Claims

1. A flexible, low porosity airfoil skin comprising multilayer flexible, annealed metallic mesh members consisting of two or three such members, each member selected from the group consisting of nickel, nickel-copper alloys, and stainless steel, the members having a mesh size from 60 to 100, the members interlocked mechanically, said skin having been reduced in the range from 2.5 to 3.0, and thereafter annealed.

4,091,147

WELDED STEEL PRODUCTS HAVING LOW SENSITIVITY TO WELD CRACKING AND A PRODUCTION METHOD THEREOF

Shogo Kanazawa, Kamakura; Akira Nakashima, Hiratsuka; Kazunari Yamato, Sagamihara; Naoyuki Seriu, Machida; Tohru Watanabe, Fukuoka, and Susumu Nakazawa, Sagamihara, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Nov. 4, 1976, Ser. No. 738,700
Claims priority, application Japan, Nov. 7, 1975, 50-133012
Int. Cl.[2] B32B 15/18
U.S. Cl. 428—683 6 Claims

1. A welded steel product having a low sensitivity to weld cracking, produced by welding a base steel material consisting essentially of 0.02 to 0.20% of carbon, 0.1 to 1.0% of silicon, 0.3 to 3.0% of manganese, 0.005 to 0.30% in total of at least one rare earth metal element and 0.005 to 0.20% in total of at least one element selected from tellurium and selenium, with the balance being iron and unavoidable impurities, said welded steel product having a weld metal consisting essentially of not more than 0.20% of carbon, not more than 1.0% of silicon, 0.3 to 5.0% of manganese, 0.0005 to 0.10% in total of at least one rare earth metal element and 0.005 to 0.10% in total of at least one element selected from tellurium and selenium, with the balance being iron and unavoidable impurities.

4,091,148

METHOD OF IMPREGNATING CONCRETE

Paul Richard Blankenhorn, 106 Horseshoe Cir., Pennsylvania Furnace, Pa. 16865; David Andrew Whiting, 1883 Willow Hill Ct., Northfield, Ill. 60093, and Donald Edgar Kline, 1210 E. Branch Rd., State College, Pa. 16801

Filed Nov. 8, 1976, Ser. No. 739,977
Int. Cl.[2] B05D 3/02
U.S. Cl. 427—314 4 Claims

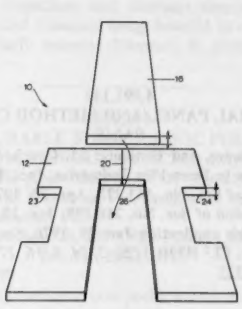
1. A process for impregnating concrete which comprises:
(a) partially drying said concrete to a moisture content of from about 4% to about 8% by weight,
(b) impregnating said dried concrete by allowing it to absorb a liquid epoxy devoid of catalyst at elevated temperature and at atmospheric pressure, and
(c) curing said epoxy resin in situ by heating said impregnated concrete to a temperature of from about 150° to about 200° C. for at least about 24 hours, using as catalyst the water remaining in said partially dried concrete.

4,091,149

PAD FOR VEHICLE HAVING FLAT BED

Ozmer Lee Oxendine, Rte. 3, Box 083-A, Maxton, N.C. 28364

Filed Aug. 18, 1976, Ser. No. 715,578
Int. Cl.[2] F16B 5/02
U.S. Cl. 428—33 1 Claim

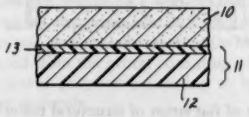


1. A flat, composite pad construction adapted for overlying substantially the entire rectangular bed surface of a flatbed vehicle and having a pliable cover with top, side and bottom surfaces encasing a filler material, said pad comprising a base portion foldable in hinge fashion along a longitudinal centerline and with an outline substantially conforming to the perimeter of the bed surface, said base portion having a substantially rectangular central recess extending from one marginal edge portion along said longitudinal centerline of said pad for a distance equal to the width of said pad and having a pair of cutouts along the sidewalls thereof for accommodating vehicle wheel wells protruding into the bed, and a central panel portion having substantially the same thickness as said base portion and having a width and length mating said central access whereby said central panel portion is adapted for placement longitudinally within said central recess to form a continuous pad covering the bed surface and for removal from said central recess to form a walkway over the bed surface along the longitudinal centerline of the pad and with the length of said panel portion being adapted to mate the width of said pad for employment as a pillow crosswise thereof.

4,091,150
COEXTRUDED POLYESTER SPLICING TAPE

Glenn E. Roelofs, Saint Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 491,131, Jul. 23, 1974, Pat. No. 4,011,358. This application Sep. 7, 1976, Ser. No. 720,981
Int. Cl.[2] B32B 3/00
U.S. Cl. 428—57 3 Claims

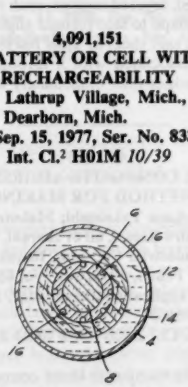


1. A splice comprising sheet ends abutted to define a juncture line, a layer of thermoset adhesive overlapping said juncture line and adherently bonded adjacent said juncture line to the surface of said sheet ends, and adherently bonded to the surface of said layer of thermoset adhesive a biaxially oriented and heat-set coextruded film consisting essentially of (A) a base layer of dimensionally stable crystalline first polyester selected from the group consisting of polyethylene terephthalate, polycyclohexane dimethyl terephthalate and polyethylene naphthalate (B) an adhesion-promoting layer having a thickness from about one-fourth of the total thickness of said support layer to about 1 mil thick of a second polyester having a minor degree of crystallinity between about 20° C and 230° C and melting at a temperature less than about 230° C wherein said adhesion-promoting layer is a polyester produced by the condensation reaction of a dicarboxylic acid component consisting of from about 10 to about 100 mole percent of a dicarboxylic acid selected from the group consisting of isophthalic acid, hexahydroterephthalic acid, sebaic acid, succinic acid, adipic acid, azelaic acid, suberic acid, pimelic acid, glutaric acid or mixtures thereof, or the diesters of such acids and correspondingly from 90 to zero mole percent of terephthalic acid, and a glycol component, in substantially equimolar proportions with the dicarboxylic acid component, wherein the glycol component is selected from the group consisting of polymethylene glycol of the formula $HO(CH_2)_nOH$, wherein n is an integer of 2–10, neopentyl glycol, 1,4-cyclohexane dimethanol and bisphenol A, said coextruded film being bonded to said thermoset layer on said adhesion-promoting layer surface.

4,091,151
SECONDARY BATTERY OR CELL WITH IMPROVED RECHARGEABILITY

Robert W. Minck, Lathrup Village, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Sep. 15, 1977, Ser. No. 833,548
Int. Cl.[2] H01M 10/39
U.S. Cl. 429—104 26 Claims



1. In a secondary battery or cell comprising:

A. an anodic reaction zone containing a molten alkali metal reactant-anode in electrical contact with an external circuit;

B. A cathodic reaction zone containing a cathodic reactant which, when said battery or cell is at least partially discharged, is selected from the group consisting of (i) a single phase composition comprising molten polysulfide salts of said anodic reactant and (ii) a two-phase composition comprising molten sulfur and molten sulfur saturated polysulfide salts of said anodic reactant;

C. A cation-permeable barrier to mass liquid transfer interposed between and in contact with said anodic and cathodic reaction zones; and

D. An electrode of porous conductive material within said cathodic reaction zone for transporting electrons to the vicinity of said cation-permeable barrier during discharge of said battery or cell and for transporting electrons away from the vicinity of said cation-permeable barrier during charge of said battery or cell, said porous conductive material being in electrical contact with both said cation-permeable barrier and said external circuit and being immersed, at least in part, in said cathodic reactant,

wherein the improvement comprises employing a cation-permeable barrier having major grooves or channels disposed in the surface thereof which is in contact with said cathodic reaction zone, said grooves or channels being devoid of said porous conductive material and being adapted in size and shape such that polysulfide salts within said cathodic reaction zone can flow therein by capillary forces.

4,091,152
LITHIUM SO_2 CELL

M. L. Bhaskara Rao, Billerica, and Carl R. Schlaikjer, Arlington, both of Mass., assignors to P.R. Mallory & Co. Inc., Indianapolis, Ind.

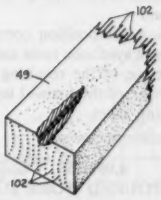
Division of Ser. No. 388,370, Aug. 16, 1973, Pat. No. 3,953,302. This application Oct. 17, 1975, Ser. No. 623,227
Int. Cl.[2] H01M 6/16, 10/26; C25D 3/56; C25C 1/02
U.S. Cl. 429—105 5 Claims

1. A rechargeable cell capable of plating non-dendritic lithium which comprises a sulfur dioxide cathode, a lithium anode, and an aprotic non-aqueous electrolyte, with said electrolyte comprising a non-aqueous solvent having dissolved therein a lithium salt and an addition agent comprising a metal salt which metal is reducible by lithium and capable of coplating therewith, and wherein the concentration of said addition agent does not exceed the amount which will render the plated lithium at least one and a half volts more noble than the normal lithium EMF activity.

4,091,153
ARTIFICIAL BOARDS AND SHAPES

John A. Holman, 1206 Rutledge Way, Anderson, S.C. 29621

Division of Ser. No. 321,153, Jan. 5, 1973, Pat. No. 3,890,077. This application Mar. 26, 1975, Ser. No. 562,358
Int. Cl.[2] B29C 15/00
U.S. Cl. 428—114 6 Claims



1. An elongated board of artificial lumber having a length much greater than the width and thickness and being of a predetermined thickness comprising: a homogeneous mixture of ligneous wood fibers and a cured thermosetting resin, a plurality of spaced elongated reinforcing strands extending the length of said board, said fibers and said resin on opposite sides of said board being compressed to said predetermined thickness and densified by having been heated and compressed

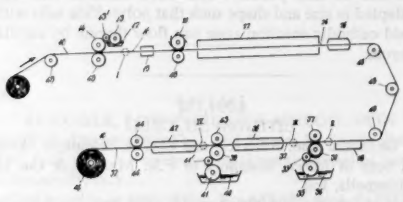
under pressure while being held at said predetermined thickness defining smooth continuous outer layers having a substantially uniform density about the length of said board, a continuous core extending the length of said board having a density less than said outer layers, and said homogeneous mixture of fibers and resin forming a bond around said elongated reinforcing strand affording longitudinal and transverse strength to said board.

4,091,154

DECORATIVE SYNTHETIC RESIN SHEETS HAVING THREE-DIMENSIONAL PATTERN FOR WALLS, CEILINGS OR FURNITURE AND PROCESS FOR MANUFACTURING SAME

Junichiro Hirai, Osaka, Japan, assignor to Tokiwa Leather Industrial Co., Ltd., Japan

Filed Jun. 9, 1976, Ser. No. 694,487
Claims priority, application Japan, Jun. 20, 1975, 50-76251
Int. Cl.[2] B29D *27/00*; B29C *21/00*; B29D *7/20*
U.S. Cl. 428—158 **8 Claims**



1. A process for manufacturing a decorative synthetic resin sheet having a three-dimensional pattern suitable for a surface covering, comprising:

(a) coating one surface of a thin base sheet with a paste-like composition consisting predominantly of a synthetic thermoplastic resin composition containing a plasticizer, a blowing agent, a stabilizer, a pigment and a coloring agent to form a coating layer on the base sheet, drying the coating layer by heating at a temperature below the decomposition temperature of the blowing agent and thereafter delustering the surface of the coating layer with a suitable solvent,

(b) foaming the delustered coating layer by heating at a temperature at which the blowing agent decomposes to obtain a foamed layer, then cooling and stabilizing the foamed coating layer,

(c) reheating only a surface of the foamed layer after cooling and stabilizing the foamed layer while leaving unheated a portion of said layer remote from said surface,

(d) subjecting the surface of the foamed layer to hot-embossing immediately after the reheating and then cooling the embossed foam, and

(e) applying a coating composition comprising a coloring agent, a plasticizer, a synthetic resin and a solvent only to the raised top surface of the resulting embossed pattern formed on the surface of the foamed layer by step (d) and cooling the resulting sheet.

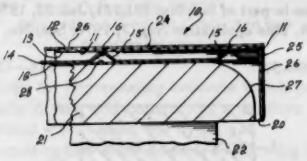
4,091,155

CONTOURED WORK TOP

Joseph Henry Behr, 4000 deMaisonneuve, Westmount, Quebec, Canada (H3Z 1J9)

Filed Jul. 22, 1977, Ser. No. 818,196
Int. Cl.[2] B32B *3/30, 3/28*
U.S. Cl. 428—167 **10 Claims**

1. A contoured work top comprising a flat sheet of structural material having a top surface and a lower surface, a second sheet of structural material having a plurality of spaced apart parallel ribs with tip ridges extending across the second sheet, the second sheet being rigidly connected to the lower surface by the tip ridges of the ribs thus supporting the second sheet at a spaced apart distance from the flat sheet,



and a plurality of flat strips of structural material extending across the second sheet perpendicular to the ribs and rigidly connected to the second sheet at locations between the ribs.

4,091,156

MANUFACTURED GLASS BY CONTIGUOUS FLOAT PROCESS

Charles K. Edge, Sarver, and Gerald E. Kunkle, New Kensington, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 338,497, Mar. 6, 1973, Pat. No. 3,843,346.
This application Jun. 13, 1974, Ser. No. 479,010
The portion of the term of this patent subsequent to Oct. 22, 1991, has been disclaimed.
Int. Cl.[2] B32B *3/02*
U.S. Cl. 428—192 **1 Claim**

1. A flat glass article made by supporting glass on molten metal while advancing it therealong and cooling it comprising a sheet of glass having two substantially parallel planar surfaces, spaced apart a distance designated as the thickness of said sheet, one surface having been in contact with molten metal while making said article, two formed edges and two cut edges, each intersecting both formed edges, said cut edges being characterized under sufficient magnification as comprising a series of nested, layered regions, each region substantially corresponding in shape to said formed edges as intersected by said cut edges, and said sheet of glass having substantially less optical distortion associated with it throughout its width between its formed edges than immediately adjacent its formed edges.

4,091,157

HEAT-CURABLE COMPOSITE ADHESIVE SHEET AND METHOD FOR MAKING

Yutaka Hori; Hidekazu Takahashi; Makoto Sunakawa; Ichiro Ijichi, and Kiyohiro Kamei, all of Ibaraki, Japan, assignors to Nitto Electric Industrial Co., Ltd., Ibaraki, Japan

Filed Feb. 4, 1976, Ser. No. 655,198
Claims priority, application Japan, Mar. 27, 1975, 50-37611; Apr. 16, 1975, 50-46663
Int. Cl.[2] B32B *7/10*; C09J *5/04*
U.S. Cl. 428—196 **64 Claims**

1. A heat-curable composite sheet comprising a first layer comprising at least one unsaturated compound which is free radical reactive selected from the group consisting of

i. an unsaturated polymer containing at least two double bonds per molecule;

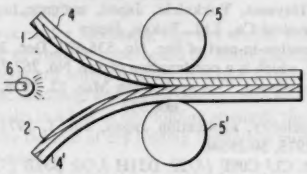
ii. a mixture of an unsaturated polymer containing at least two double bonds per molecule and an unsaturated monomer; or

iii. a mixture of an unsaturated polymer containing at least two double bonds per molecule and an unsaturated poly-

mer containing one double bond per molecule, and a second layer comprising a solid or liquid free radical initiator, said layers being bonded to each other in a laminate as separate layers at a temperature at which the free radical initiator does not lose its free radical initiating capability, wherein said sheet is capable of being cured by the melting and mixing together of the first and second layers at a temperature at which a free radical reaction takes place in said composite sheet.

43. A process for producing a heat-curable multilayer composite sheet, which comprises heat softening a first layer comprising at least one unsaturated compound which is free radical reactive selected from the group consisting of

i. an unsaturated polymer containing at least two double bonds per molecule;



ii. a mixture of an unsaturated polymer containing at least two double bonds per molecule and an unsaturated monomer; or

iii. a mixture of an unsaturated polymer containing at least two double bonds per molecule and an unsaturated polymer containing one double bond per molecule,

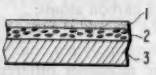
and a second layer comprising a solid or liquid free radical initiator at a temperature at which the free radical initiator does not lose its free radical reaction initiating ability, to thereby render said first layer tacky followed by bonding the first and second layers to each other, wherein said composite sheet is capable of being cured by the melting and mixing together of the first and second layers.

4,091,158

MAGNETIC RECORDING MEMBERS

Akira Kasuga; Goro Akashi, and Osamu Suzuki, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Apr. 12, 1976, Ser. No. 676,177
Claims priority, application Japan, Apr. 11, 1975, 50-44017
Int. Cl.[2] B32B *7/02*; G11B *5/74*
U.S. Cl. 428—216 **7 Claims**



1. A magnetic recording medium comprising a non-magnetic support and upper and lower magnetic layers provided on said non-magnetic support, said magnetic layers comprising a ferromagnetic fine powder and a binder, wherein the uppermost layer of said magnetic layers has a dry thickness of about 0.3 to about 2.5 μm and said ferromagnetic fine powder contained in said uppermost layer is ferromagnetic iron oxide having an APP value of not more than 1.0 and a coercive force of about 330 to 450 Oe, and the ferromagnetic iron oxide of said upper layer having been heat treated in a gaseous phase under the following conditions to reduce its APP value to said value of not more than about 1.0; a temperature of 350° to 550° C, a pressure of 1 to 1.5 atmosphers and a treating time of 1 to 6 hours; and the lower magnetic layer has a dry thickness of about 3 to about 15 μm with said ferromagnetic fine powder contained in said lower layer being ferromagnetic iron oxide having an APP value of about 5 to about 10 and a coercive force of about 250 to 350 Oe.

4,091,159

BONDED STRUCTURES

Donald Lithgow Brydon, and Jiri George Tomka, both of Harrogate, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Oct. 4, 1976, Ser. No. 728,995
Claims priority, application United Kingdom, Oct. 13, 1975, 41839/75
Int. Cl.[2] B32B *27/02, 31/26*
U.S. Cl. 428—236 **8 Claims**

1. A process for thermally bonding together contiguous shaped articles formed from a polyarylene oxadiazole having an X-ray diffraction pattern which shows a single equatorial reflection, the process comprising heating the said articles to a temperature above the glass transition temperature while under a pressure of at least 20 kg/cm^2.

6. A bonded structure formed from shaped articles of a polyarylene oxadiazole having an X-ray diffraction pattern which shows a single equatorial reflection, by heating said shaped articles to a temperature above their glass transition temperature while under a pressure of at least 20 kg/cm^2.

4,091,160

ACOUSTICAL LAMINATE

Muriel L. Koss, Arlington, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.

Filed Mar. 31, 1976, Ser. No. 672,353
Int. Cl.[2] B32B *7/00*
U.S. Cl. 428—245 **4 Claims**

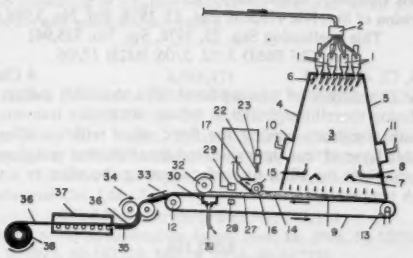
1. An acoustical laminate comprising at least two sheets of open weave glass fiber fabric impregnated with from about 13 to 32 weight percent cured epoxy resin, based on glass fabric weight, said laminate being porous to the extent of having an airflow resistance of about 2 to 60 rayls at an airflow velocity of about 17 cm/sec and having a thickness of from about 0.02 to 0.10 inch.

4,091,161

NON-WOVEN WEBS AND METHOD FOR THE DRY PRODUCTION THEREOF

Jean Desverchére, Lyons, France, assignor to Cefilac, Paris, France

Filed Jan. 30, 1976, Ser. No. 653,665
Claims priority, application France, Mar. 11, 1975, 75 08312
Int. Cl.[2] D04H *1/58*
U.S. Cl. 428—288 **9 Claims**



1. A process for the dry production of non-woven uniform webs from particulate materials wherein particles are fed simultaneously over a substantial length of a conveyor belt, and at a superficial volume flow rate of less than 2,000 cm^3/m^2/min, subjecting the particles, upstream and downstream of the feed zone, to an upwardly directed return air flow above the belt and withdrawing the return air flow above

the point of introduction, which assists in the distribution of the supply of particles over the whole length of the feed zone, and carrying out the feeding in a current of air which moves at low speed with local zones of turbulence imparting to the particles a vertical speed component substantially lower than the speed of free fall, the particles being arranged randomly on the conveyor belt in the form of an uncompacted homogeneous and isotropic aerated layer having a percentage of empty space greater than 95%, and, at subsequent downstream points, levelling, predensifying, and, optionally, calendering the layer.

4,091,162
ADHESIVES

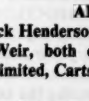
Neil Kirkpatrick Henderson, West Kilbride, and Eric Thomson, Bridge of Weir, both of England, assignors to Smith & McLaurin Limited, Cartside Mills, Millikenpark, Great Britain

Filed Apr. 5, 1976, Ser. No. 673,418

Claims priority, application United Kingdom, Apr. 4, 1975, 13868/75

Int. Cl.[2] B32B *5/16, 27/14*

U.S. Cl. 428—327 **8 Claims**



1. A delayed-tack adhesive composition comprising core-shell polymers in combination with solid plasticizer means, the core-shell polymers having a soft and tacky polymeric core and a hard and non-tacky polymeric shell, and the solid plasticizer means being means, when melted, to dissolve the hard polymeric shell.

8. A substrate coated with a delayed-tack adhesive composition according to claim 1.

4,091,163
FUSED SILICA ARTICLE HAVING TITANIA-SILICATE BARRIER ZONE

Edward M. Clausen, Eastlake, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 478,926, Jun. 13, 1974, Pat. No. 3,988,628. This application Sep. 23, 1976, Ser. No. 725,961

Int. Cl.[2] B05D *3/02, 5/06;* **B32B** *17/06*

U.S. Cl. 428—336 **4 Claims**

1. The method of treating fused silica to inhibit sodium ion diffusion therethrough and to reduce ultraviolet transmission which comprises coating the fused silica with an adherent visible layer of titanium oxide, and then diffusing said titanium dioxide into the silica by surface-heating the silica to a very high temperature.

4,091,164
POLYMER MODIFIED HYDROPHILIC INORGANIC FILLERS FOR THERMOPLASTIC POLYMERIC MATERIALS

Eckhard C. A. Schwarz, 115 N. Park Ave., Neenah, Wis. 54956

Division of Ser. No. 573,217, Apr. 30, 1975, Pat. No. 4,017,452. This application Nov. 5, 1976, Ser. No. 739,226

Int. Cl.[2] B32B *5/16, 9/04, 19/02*

U.S. Cl. 428—404 **3 Claims**

1. A particulate filler material which is readily dispersible in thermoplastic polymeric resins, said filler material comprising a particulate inorganic filler which has a hydrophilic surface having an aqueous wetting angle of less than 50° and coated with a block copolymer having an A-B-A structure with the A units being a homopolymer of ethylene oxide, the B unit being a homopolymer of propylene oxide, and the mole ratio of ethylene oxide to propylene oxide being within the range of 40:60 and 90:10 and having an average molecular weight of at least 3,000, the amount of said inorganic filler being within the range of about 5 to about 95 weight %, based on the total weight of said filler material.

4,091,165
SURFACE PROCESSING COPOLYMER FOR SYNTHETIC PAPERS

Kazuhide Hayama, Yokkaichi, Japan, assignor to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 536,697, Dec. 26, 1974, abandoned, which is a continuation of Ser. No. 267,734, Jun. 29, 1972, abandoned. This application Mar. 12, 1976, Ser. No. 666,373

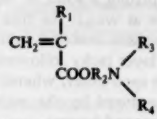
Claims priority, application Japan, Jul. 1, 1971, 46-48248; Mar. 13, 1975, 50-29586

Int. Cl.[2] C08F *18/22;* **D21H** *5/00;* **B32B** *27/30*

U.S. Cl. 428—409 **9 Claims**

1. A synthetic paper comprising a paper-like synthetic resin film or sheet having coated on at least one surface thereof an N-ampho-ionized copolymer treated with a monohaloacetic acid salt, said copolymer comprising:

(1) about 25 to about 35% by weight of a monomer represented by general formula (I):



(I)

wherein R_1 is a hydrogen atom or a methyl group, R_2 is an alkylene group having 1 to 4 carbon atoms and R_3 and R_4 are each an alkyl group having 1 to 4 carbon atoms;

(2) about 30 to about 45% by weight of a monomer represented by general formula (II):

(II)

wherein R_1 is the same as defined above and R_5 is an alkyl group having 12 to 18 carbon atoms;

(3) 0 to about 15% by weight of a hydrophilic monomer; and

(4) the balance of the copolymer comprising a copolymerizable hydrophobic monomer different from components (1) to (3), wherein the total amount of components (1) and (3) is not less than about 30% by weight.

4,091,166
BORON TRIFLUORIDE COATINGS FOR THERMOPLASTIC MATERIALS AND METHOD OF APPLYING SAME IN GLOW DISCHARGE

Ronald Michael Kubacki, Rancho La Costa, Calif. (by Alan M. Lovelace), assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jun. 17, 1977, Ser. No. 807,762

Int. Cl.[2] B05D *3/06*

U.S. Cl. 428—411 **11 Claims**

1. A method for depositing a single layer coating on a plastic substrate, comprising the step of subjecting the substrate to bombardment by boron trifluoride in plasma form.

8. A plastic surface coated with a layer of plasma deposited boron trifluoride.

4,091,167

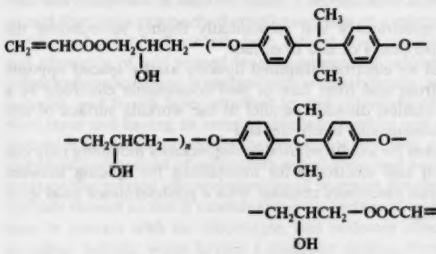
METHOD FOR PREPARING PAPER BOARD HAVING IMPROVED WET COMPRESSION STRENGTH

Toshio Okada, Kadoma; Hideharu Ohtsuki; Hiroshi Inagaki, both of Kyoto; Toshiaki Hanyuda, Yokohama; Masateru Tokuno, Nishinomiya, and Seiichi Igarashi, Suita, all of Japan, assignors to Rengo Co., Ltd., Japan

Continuation of Ser. No. 506,053, Sep. 16, 1974, abandoned. This application May 12, 1976, Ser. No. 686,217
Claims priority, application Japan, Sep. 21, 1973, 48-105880
Int. Cl.[2] B05D *3/06*
U.S. Cl. 428—413 7 Claims

1. In a process for increasing the wet tensile strength and compression strength of paperboard by impregnating or coating said paperboard with a mixture of epoxy acrylate prepolymer in acrylic monomer and curing said mixture which process however results in a loss of dry folding strength, the improvement whereby the loss of dry folding strength is minimized by using as the mixture

(i) a prepolymer having the chemical formula,



wherein $n = 1, 2, 3 \ldots$; the molecular weight of said prepolymer being 500 to 2,000 and

(ii) at least one monomer selected from the group of methyl acrylate, ethyl acrylate and butyl acrylate,

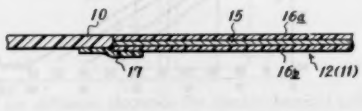
the weight ratio of prepolymer to monomer being 1:7 - 2:3.

4,091,168

LEADER FOR MAGNETIC RECORDING TAPE HAVING COEXTENSIVE FLEXIBLE LAYERS WITH METAL LAMINATED THEREBETWEEN

Katsuyoshi Kawamata, Shiogama, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Apr. 12, 1976, Ser. No. 675,955
Claims priority, application Japan, Apr. 14, 1975, 50-50287[U]
Int. Cl.[2] B32B *27/04, 15/08*
U.S. Cl. 428—416 5 Claims



1. A tape leader secured at one end to an end of a recording tape, the tape leader comprising:

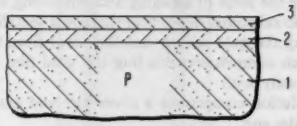
two coextensive flexible layers of synthetic resin having substantially the same thickness, flexibility, resistance to moisture, resistance to crumpling, and properties of stretch, and a layer of metal material laminated therebetween.

4,091,169

SILICON OXIDE/SILICON NITRIDE MASK WITH IMPROVED INTEGRITY FOR SEMICONDUCTOR FABRICATION

Armin Bohg, Ehningen; Eckehard Ebert, Boblingen, and Erich Mirbach, Sindelfingen, all of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 7, 1976, Ser. No. 720,542
Claims priority, application Germany, Dec. 18, 1975, 2557079
Int. Cl.[2] B32B *17/06*
U.S. Cl. 428—428 16 Claims



1. A silicon semiconductor substrate having an oxidized surface coated with a unitary layer comprising an imperforate film of silicon nitride carbon dispersed therein.

3. A semiconductor structure comprised of a silicon substrate, a layer of silicon dioxide on a surface of said substrate, and a cohesive unitary layer comprising an imperforate film of a carbon containing silicon nitride on said oxide layer.

11. In a method of fabricating semiconductor devices from a semiconductor substrate having a silicon dioxide layer formed on a surface thereof, the improvement comprising forming on said oxide layer a unitary imperforate layer of a carbon containing silicon nitride pyrolytically deposited from an atmosphere comprised of an aliphatic hydrocarbon, a member selected from the group of silane, halogensilanes, alkyl silanes and arylsilanes, and a member from the group of ammonia and amines.

4,091,170

COATING COMPOSITION FOR ORGANIC POLYMERIC FILMS

John N. Godfrey, Asheville, N.C., assignor to Olin Corporation, Pisgah Forest, N.C.

Filed Oct. 31, 1977, Ser. No. 847,407
Int. Cl.[2] B32B *27/06, 23/08*
U.S. Cl. 428—510 13 Claims

1. In a vinylidene chloride copolymer coating composition for organic polymeric films, the improvement comprising incorporating in the coating composition from about 0.4 to 1.5% by weight of an alkali metal salt of lauryl sulfate and from about 0.2 to 1.0% by weight of a stearate salt selected from the group consisting of alkaline earth metal stearates, alkali metal stearates, and ammonium stearate.

4,091,171

OPTICAL INFORMATION STORAGE MATERIAL AND METHOD OF MAKING IT

Takeo Ohta, Nara; Mutsuo Takenaga, Katano; Nobuo Akahira, Neyagawa; Noboru Yamada, Moriguchi, and Tadaoki Yamashita, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Nov. 18, 1976, Ser. No. 743,214
Claims priority, application Japan, Nov. 18, 1975, 50-139033; Dec. 9, 1975, 50-147224; Dec. 9, 1975, 50-147225
Int. Cl.[2] B05D *1/34;* G11B *11/12, 23/00*
U.S. Cl. 428—539 11 Claims

1. In an optical information storage material having a substrate and a film deposited on said substrate, the state of which can be changed between the low optical density state and the high optical density state by the application of electrical, optical, or thermal energy, the improvement wherein said film comprises at least one sub-oxide composition selected from the group consisting of GeO_{x1}, SnO_{x1}, SbO_{x2}, TlO_{x2}, BiO_{x2} and

MoO_{x3}, wherein $0 < x1 < 2.0$, $0 < x2 < 1.5$, and $0 < x3 < 3.0$.

4,091,172

UNIFORM GOLD FILMS

Richard G. Miller, Pittsburgh, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 14, 1976, Ser. No. 750,474
Int. Cl.² C23C 3/02
U.S. Cl. 428—630 **9 Claims**

1. In a method for making a gold colored coated article comprising the steps of cleaning and sensitizing a surface of a nonmetallic substrate, depositing thereon a metallic gold film, and coating the gold with a metallic silver film, the improvement which comprises contacting the gold film substantially simultaneously with

(a) a solution comprising a silver salt and ammonium hydroxide; and

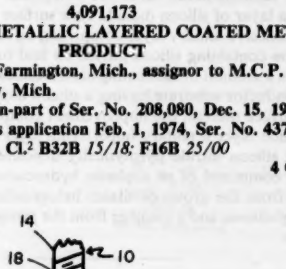
(b) a solution comprising a reducing agent for silver ions to deposit a transparent metallic silver film over the gold film.

4,091,173

MULTIPLE METALLIC LAYERED COATED METAL PRODUCT

Jacob M. Hage, Farmington, Mich., assignor to M.C.P. Industries, Inc., Troy, Mich.

Continuation-in-part of Ser. No. 208,080, Dec. 15, 1971, abandoned. This application Feb. 1, 1974, Ser. No. 437,801
Int. Cl.² B32B 15/18; F16B 25/00
U.S. Cl. 85—41 **4 Claims**



3. A metal plated product suitable for corrosion resistant product uses, said product having a structural makeup of layers in sequence comprising,

(a) a steel base metal,

(b) layer means consisting essentially of copper,

(c) layer means consisting essentially of cadmium,

(d) layer means consisting essentially of copper,

(e) layer means consisting essentially of nickel,

(f) layer means consisting essentially of chromium,

and said layer means being for the most part applied by electrolytic coating process and being operative to enable high corrosion resistance properties, and good adhesion properties.

4. The invention of claim 3 wherein,

said product is a self-drilling plated carbon steel fastener.

4,091,174

ELECTROCHEMICAL BATTERY

Jean Ruch, and Dieter Hasenauer, both of Brilon, Germany, assignors to Accumulatorenwerk Hoppecke Carl Zoellner & Sohn, Cologne, Germany

Filed Feb. 14, 1977, Ser. No. 768,046
Claims priority, application Germany, Feb. 25, 1976, 2607519
Int. Cl.² H01M 8/22
U.S. Cl. 429—27 **28 Claims**

1. A device for production of high outputs with high current densities in an electrochemical system, particularly a metal - air cell, comprising

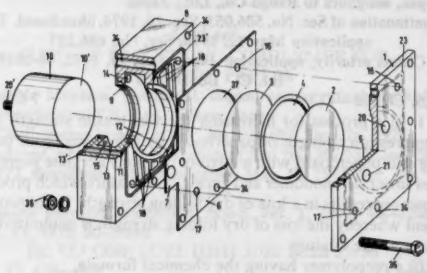
a consumable electrode.

an air electrode spaced from said consumable electrode with electrolyte disposed in an electrolyte space defined therebetween,

means for taking-off current from one of said electrodes,

said consumable electrode having a rod-shaped spacial form made of a compact metal at least in part and constituting a metallic solid body, said consumable electrode having a front face constituting a sole working surface and projecting sealed in the electrolyte space,

means for sealing said front face of said consumable electrode relative to the electrolyte space, said sealing means



constitutes a seal substantially flushly surrounding the periphery of said front face,

said air electrode disposed directly axially spaced opposite from said front face of said consumable electrode by a smallest distance parallel to the working surface of said consumable electrode, and

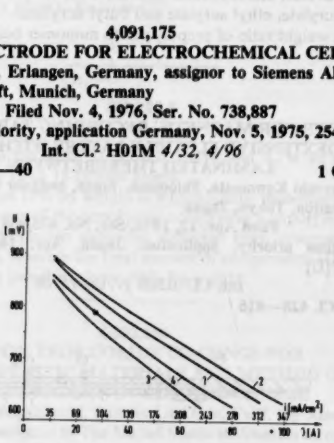
means for axially adjustably displaceably mounting only one of said electrodes for maintaining the spacing between said electrodes constant with a predetermined axial spacing.

4,091,175

AIR ELECTRODE FOR ELECTROCHEMICAL CELLS

Karl Höhne, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Nov. 4, 1976, Ser. No. 738,887
Claims priority, application Germany, Nov. 5, 1975, 2549621
Int. Cl.² H01M 4/32, 4/96
U.S. Cl. 429—40 **1 Claim**



1. In an air electrode for electrochemical cells containing silver coated carbon as a catalytic material the improvement comprising:

the catalytic material also containing nickel hydroxide with the nickel content being up to about 2% by weight and the weight ratio of silver to carbon in said catalytic material about 1:1.

4,091,176

POROUS ELECTRODE

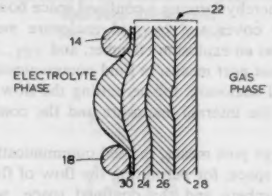
Marinus Alfenaar, Schinnen, Netherlands, assignor to Stamicarbon, B.V., Geleen, Netherlands

Filed Mar. 9, 1976, Ser. No. 665,447

Claims priority, application Netherlands, Mar. 11, 1975, 7502842

Int. Cl.[2] H01M *4/62, 4/64, 4/86*

U.S. Cl. 429—40 23 Claims



1. A porous electrode comprising a porous electrically conductive structure including a plurality of layers, said plurality of layers including a first layer which when said electrode is in operation is in contact with the electrolyte, said first layer being a conductive layer having a porosity of at least 80 percent and comprised of metallic fibers, a second layer attached to said first layer exteriorly thereof comprised of a mixture of carbon and polytetrafluoroethylene, a third layer attached to and exteriorly of said second layer comprised of carbon and polytetrafluoroethylene together with a catalytically active material, and fourth layer attached to and exteriorly of said third layer and having an exterior side which when said electrode is in operation is opposite the electrolyte side, said fourth layer being comprised of polytetrafluoroethylene and a collector structure pressed into said plurality of layers on the electrolyte side thereof so that it extends along the surface of said first layer in contact with the electrolyte, said collector structure including metallic wires having a thickness ranging between about 150μm to about 350μm and a porosity ranging from about 40 percent to about 75 percent.

4,091,177

GAS DIFFUSION ELECTRODES FOR ELECTROCHEMICAL CELLS WITH ACID ELECTROLYTES

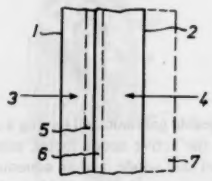
Jochen Heffler, Grossauheim, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Germany

Filed Dec. 13, 1976, Ser. No. 749,663

Claims priority, application Germany, Dec. 17, 1975, 2556731

Int. Cl.[2] H01M *4/86, 4/92*

U.S. Cl. 429—42 5 Claims



1. A gas diffusion electrode for electrochemical cells with acid electrolytes, comprisinga hydrophobic layer of gas permeable electrically conductive material having a thickness of up to 0.2 mm and having pores with a most frequent pore diameter of about 1.8 microns, and a hydrophilic layer containing a catalyst closely bonded to said hydrophobic layer and having pores with a most frequent pore diameter of 0.08 microns.

4,091,178

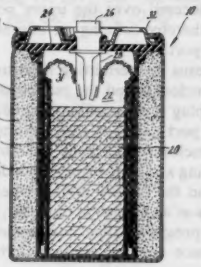
RECHARGEABLE ALKALINE MNO_2-ZINC CELL

Karl Victor Kordesch, Lakewood, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Filed Sep. 1, 1977, Ser. No. 829,925

Int. Cl.[2] H01M *10/24*

U.S. Cl. 429—60 13 Claims



1. A rechargeable alkaline MnO_2-zinc cell comprising:

a cathode composed of a compressed mixture of manganese dioxide particles, electrically conductive particles and a binder;

an anode containing amalgamated metallic zinc particles on an electrically conductive carrier, said zinc particles having a predetermined discharge capacity of no greater than about one-third of the discharge capacity of said cathode;

a separator member for separating said cathode from said anode;

an aqueous alkaline electrolyte; and

a charge reserve mass in contact with said anode and comprising an oxide or hydroxide of zinc in an amount sufficient to provide a charge reserve capacity for said cell equal to at least about 50 percent of said predetermined anode discharge capacity.

4,091,179

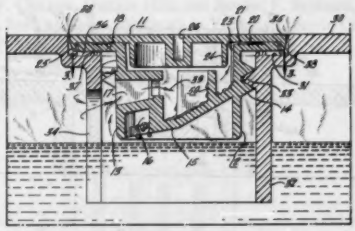
VENT SYSTEM WITH FLAME ARRESTING CAPABILITY

Joseph F. Szabo, North Olmsted, Ohio, assignor to ESB Incorporated, Philadelphia, Pa.

Filed Apr. 13, 1977, Ser. No. 787,018

Int. Cl.[2] H01M *2/12*

U.S. Cl. 429—84 9 Claims



1. A battery vent system having a flame arresting capability for preventing the propagation of a flame, caused by ignition of flamable gases emitted from the vent system, through the vent system to the inside of the battery, wherein said vent system comprises:

a. a battery cover which has at least one vent well extending into each cell for permitting access to a battery cell, wherein the vent well has a portion which is recessed below the upper surface level of the battery cover such that upon insertion of the vent plug assembly completely into the vent well, the upper surface of the vent plug

assembly is essentially flush with the upper surface of the battery cover;

b. a vent plug assembly for insertion into the vent well, said vent plug assembly having,

(i) a body portion for insertion into the vent well, said body portion having a predetermined length;

(ii) a bottom portion connected to the lower part of the body portion;

(iii) a cap secured over the upper portion of the body portion, thereby defining an internal enclosure inside the body portion;

(iv) inlet means for permitting fluid to flow between the internal enclosure and the particular battery cell when the vent plug is inserted into the vent well; and

(v) exhaust port means in fluid communication with the internal enclosure to exhaust fluid to the atmosphere;

c. means defining a confined space bounded by the vent plug assembly and the battery cover, whereby said confined space serves as an explosion chamber;

d. means for providing fluid communication between the confined space and the exhaust port of the vent plug assembly;

e. a flame transmission prevention means located so that any fluid flowing between the confined space and internal enclosure of the vent plug assembly flows through the flame transmission prevention means, said means being designed such that a flame will not pass therethrough;

f. a discharge port means for providing fluid communication between the confined space and the atmosphere, wherein said discharge port is small in size compared to the size of the confined space, and whereby gas may be vented from the battery cell, through the internal enclosure, the exhaust port means, the confined space, and into the atmosphere through the discharge port means, and in the event the gas being discharged at the discharge port is ignited, the resulting flame travels to the confined space and creates a controlled explosion to extinguish the flame before it is propagated into the battery cell.

4,091,180

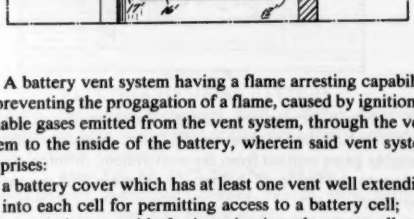
VENT SYSTEM WITH FLAME ARRESTING CAPABILITY

Albert L. Fox, University Heights; Jeffrey S. Leeson, South Euclid, and Joseph F. Szabo, North Olmsted, all of Ohio, assignors to ESB Incorporated, Philadelphia, Pa.

Filed Apr. 13, 1977, Ser. No. 787,019

Int. Cl.[2] H01M 2/12

U.S. Cl. 429—84 **20 Claims**



1. A battery vent system having a flame arresting capability for preventing the progagation of a flame, caused by ignition of flamable gases emitted from the vent system, through the vent system to the inside of the battery, wherein said vent system comprises:

a. a battery cover which has at least one vent well extending into each cell for permitting access to a battery cell;

b. a vent plug assembly for insertion into the vent well, said vent plug assembly having,

(i) a body portion for insertion into the vent well, said body portion having a predetermined length,

(ii) a bottom portion connected to the body portion,

(iii) a cap secured over the upper portion of the body portion, thereby defining an internal enclosure inside the body portion,

(iv) inlet means for permitting fluid to flow between the internal enclosure and the particular battery cell when the vent plug is inserted into the vent plug well,

(v) enclosure means extending from the upper portion of the vent plug assembly downward to a point in close proximity to the upper surface of the battery cover when the vent plug assembly is inserted in the vent plug well, thereby forming a confined space bounded by the battery cover and by said enclosure means, which serves as an explosion chamber, and

(vi) exhaust port means, in fluid communication with the internal enclosure, for permitting the flow of fluid between the internal enclosure and the confined space; and

c. a discharge port means, in fluid communication with the confined space, for permitting the flow of fluid between the atmosphere and the confined space, wherein said discharge port is small in size compared to the size of the confined space and whereby gas may be vented from the battery cell, through the internal enclosure, exhaust port means, confined space, and into the atmosphere through the discharge port means, and in the event the gas being discharged at the discharge port is ignited, the resulting flame creates a controlled explosion in the confined space to extinguish the flame before it is propagated into the battery cell.

4,091,181

RECHARGEABLE GALVANIC CELL

Ben Gilbert Merritt, Jr., Berea, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Filed Sep. 1, 1977, Ser. No. 829,924

Int. Cl.[2] H01M 10/24

U.S. Cl. 429—94 **13 Claims**

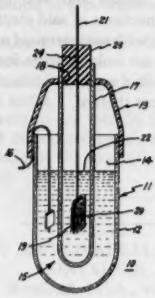
1. In a rechargeable galvanic cell having a cathode, an anode in which zinc is the active anode metal, means for separating said cathode from said anode, and an aqueous alkaline electrolyte; the improvement comprising: said anode having a coherent metallic porous structure, formed, in situ, in the presence of said aqueous alkaline electrolyte, from a metal oxide selected from the group consisting of lead oxide and copper oxide with an ampere hour capacity of between 90–100% of the initial ampere hour capacity of the active anode zinc metal, and said coherent metallic porous structure having its pores substantially filled with an oxide of zinc and an aqueous alkaline electrolyte.

4,091,182

SEALED LITHIUM ELECTROCHEMICAL CELL WITH SODIUM BETA-ALUMINA ELECTROLYTE

Gregory C. Farrington, Elnora, and Walter L. Roth, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 662,946, Mar. 1, 1976, abandoned. This application Nov. 19, 1976, Ser. No. 743,274
The portion of the term of this patent subsequent to Nov. 2, 1993, has been disclaimed.
Int. Cl.[2] H01M *10/34*
U.S. Cl. 429—101 4 Claims



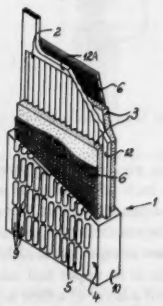
1. A sealed lithium electrochemical cell comprising a casing, an anode positioned within the casing, the anode selected from the class consisting of lithium, lithium as a solid alloy and lithium in a non-aqueous electrolyte, a cathode positioned within the casing, the cathode functioning with an anode selected from the class consisting of lithium, lithium as a solid alloy, and lithium in a non-aqueous electrolyte and a solid sodium beta-alumina ion-conductive electrolyte, and a solid sodium beta-alumina ion-conductive electrolyte positioned within the casing between the anode and cathode and in contact with both the anode and cathode.

4,091,183

ACCUMULATOR HAVING DEFORMATION RESISTING CONDUCTING CORE

Hans Niggl, Engesserstr. 4, Freiburg, Germany (D-7800)

Filed Apr. 14, 1977, Ser. No. 787,559
Int. Cl.[2] H01M *4/70*
U.S. Cl. 429—138 21 Claims



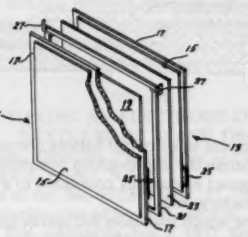
1. In an accumulator, the combination of a solid plate-like conductive core; a body of active material contacting at least the major portion of the exterior of said core; and an envelope which confines said active material, including porous layers surrounding said body, said layers having inner surfaces in substantially continuous contact with said body and at least one of said surfaces being profiled.

4,091,184

HIGH POWER, RECHARGEABLE, PILE TYPE SILVER ZINC BATTERY

Lester R. Erisman, Joplin, Mo., and Richard A. Marsh, Tipp City, Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Aug. 19, 1977, Ser. No. 826,225
Int. Cl.[2] H01M *10/32*
U.S. Cl. 429—139 6 Claims



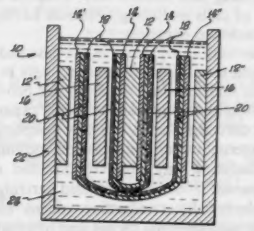
1. A high power rechargeable pile type silver zinc battery including a multicell pile having a plurality of cells with bipolar electrodes therein, each of said bipolar electrodes comprising a positive side and a negative side, said positive side being formed of a sprayed coating of a slurry of silver oxide, said negative side being formed of a vapor deposited layer of porous zinc with a sprayed coating of zinc oxide thereover, a separator positioned between each of said bipolar electrodes to retain electrolyte in said plurality of cells, sealing means surrounding said separtor for electrically isolating the bipolar electrodes and forming a cavity for retention of the electrolyte, adhesive means for positioning and retaining said sealing means in position, and an intercell connector between the positive and negative sides of the bipolar electrode to operate as a substrate for attaching active materials thereto, said intercell connector being a series connection between said plurality of cells.

4,091,185

TITANIUM/SILVER-CONTAINING CELLULOSIC SEPARATOR FOR ELECTROCHEMICAL CELLS

Roland F. Chireau, Quaker Hill, and Sandor F. Seidman, Westbrook, both of Conn., assignors to Yardney Electric Corporation, Pawcatuck, Conn.

Filed Jul. 27, 1976, Ser. No. 709,137
Int. Cl.[2] H01M *2/16*
U.S. Cl. 429—144 18 Claims

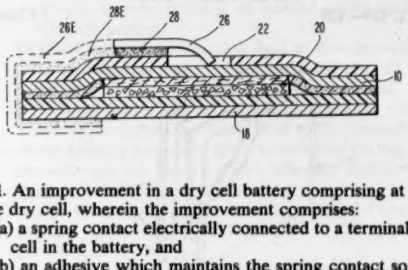


1. In an electrochemical generator, the combination of a positive silver electrode, a negative electrode, an alkaline electrolyte and a separator interposed between said positive and negative electrodes comprising titanium-silver complex-impregnated cellulose.

4,091,186
DRY CELL BATTERY HAVING ELECTRICAL SPRING CONTACT ADHERED TO TERMINAL

John J. Ott; Thomas F. Ward, and Richard D. Cyr, all of Appleton, Wis., assignors to ESB Incorporated, Philadelphia, Pa.

Filed Nov. 7, 1977, Ser. No. 849,034
Int. Cl.[2] H01M 6/42
U.S. Cl. 429—157 24 Claims

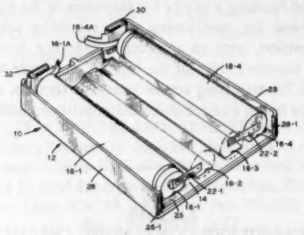


1. An improvement in a dry cell battery comprising at least one dry cell, wherein the improvement comprises:
(a) a spring contact electrically connected to a terminal of a cell in the battery, and
(b) an adhesive which maintains the spring contact so that the contact exerts a spring-like compressive force against the terminal.

4,091,187
BATTERY CARTRIDGE

Gordon E. Kaye, Garrison, N.Y., assignor to P.R. Mallory & Co. Inc., Indianapolis, Ind.

Continuation of Ser. No. 425,055, Dec. 14, 1973, abandoned. This application May 2, 1977, Ser. No. 793,004
Int. Cl.[2] H01M 6/42
U.S. Cl. 429—159 11 Claims



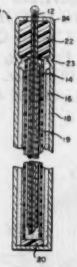
1. A disposable, sealed, removable battery cartridge, comprising
a case of insulating plastic material to accommodate and to enclose a battery having a plurality of cells;
said case including
a bottom tray for receiving and supporting the cells, and a cover for closing said bottom tray; terminal means for said battery of cells including terminals having respective planar terminal expanses;
and openings serving as windows in the case and disposed in front of said terminal means respectively in coplanar relation with said terminal expanses for providing access to abuttingly engage said terminal expanses from outside said cartridge for electrically coupling the battery to an external circuit, said case embodying support means for isolating any pressure directed onto said terminal expanses from said cells, said cartridge further including electrically conductive means electrically connected to said terminal means and to polar surfaces of said cells to provide desired battery potentials at said terminal means.

11. A battery cartridge comprising:
(a) an elongate electrically insulative case defining an interior containing a plurality of cells interconnected to provide a potential difference between a pair of polar surfaces thereof, said case defining apertures for access by external contact members to said interior thereof, said case restraining said cells from movement along the longitudinal axis thereof;
(b) cartridge terminal means;
(c) support means formed integrally with said case for supporting said terminal means interiorly of said apertures in position to be abuttingly engaged by said external contact members on movement thereof interiorly of said case and for supporting said terminal means in spaced relation to said polar surfaces of said cells; and
(d) electrically conductive means electrically interconnecting said terminal means and said cell polar surfaces, whereby such connections of said electrically conductive means respectively with said terminal means and with said cell polar surfaces are isolated from forces applied to said terminal means by said external contact members on such abutting engagement thereof.

4,091,188
ULTRAMINIATURE HIGH ENERGY DENSITY CELL

Arabinda N. Dey, Needham, Mass., assignor to P.R. Mallory & Co. Inc., Indianapolis, Ind.

Division of Ser. No. 664,780, Mar. 8, 1976, Pat. No. 4,028,138, which is a continuation-in-part of Ser. No. 314,316, Dec. 12, 1972, Pat. No. 3,945,846. This application Dec. 10, 1976, Ser. No. 749,659
The portion of the term of this patent subsequent to Mar. 23, 1993, has been disclaimed.
Int. Cl.[2] H01M 2/08
U.S. Cl. 429—174 6 Claims



1. An ultraminiature, electrical cell having a volume of less than about 0.01 cubic inch comprising an elongated, cylindrical metallic container open at one end thereof, a hollow metal needle combination current collector and electrode support, a container sealing means comprising said hollow metal needle having adhered thereto at its upper end means for sealing said open container end, and a layer of a first active solid electrode material adhered to said needle below said sealing means; said container having a second active solid electrode material layer on its inner surface; said electrode material providing a voltage difference therebetween; said needle being closed at its upper end and disposed axially within said container; an organic solvent disposed in said container; an alkali metal electrolyte salt dissolved in said organic solvent; and separating means between said first and second electrode active materials.

4,091,189
LIQUID-TIGHT SEAL FOR STORAGE BATTERIES

Alfward Farwer, Stelingen; Wolfgang Kujawa, Garbsen, and Klaus Schulze, Wettbergen, all of Germany, assignors to Varta Batterie Aktiengesellschaft, Germany

Filed Jun. 9, 1976, Ser. No. 694,472
Claims priority, application Germany, Jun. 25, 1975, 2528263
Int. Cl.² H01M 2/08
U.S. Cl. 429—181 **2 Claims**

1. An electric storage battery having a synthetic plastic case and a liquid-tight metal lead-through, comprising

a coating on the lead-through in the region in which the liquid tightness is to prevail,

the coating consisting of a mixture of colophony and polyisobutylene,

and the manufacture of the battery including the steps of

applying the mixture in solution in a solvent to the metal lead-through in the said region, thereby dissolving oxide coating on the metal,

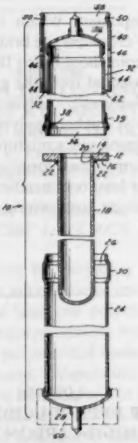
allowing the solvent to dry thereby leaving a coating of the mixture on the deoxidized metal, and

applying the plastic of the case around the metal with its mixture coating.

4,091,190
HERMETICALLY SEALED ALKALI METAL BATTERY CONTAINER

Walter K. Heintz, Westland, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed May 23, 1977, Ser. No. 799,462
Int. Cl.² H01M 2/02
U.S. Cl. 429—176 **4 Claims**



1. A hermetically sealed alkali metal battery container comprising:

a ceramic ring having top and bottom surfaces;

an inner casing of a solid alkali ion-conductive material with an open end;

sealing means for bonding said inner casing adjacent its open end to said ceramic ring so that said inner casing extends downwardly from said bottom surface of said ceramic ring;

a first metal outer casing with an open end and a closed end, said first metal outer casing surrounding said inner casing and spaced therefrom;

a second metal outer casing with an open end and a closed end, said open end being located adjacent said top surface of said ceramic ring;

a pressure accepting shoulder formed on said second metal outer casing near said open end thereof;

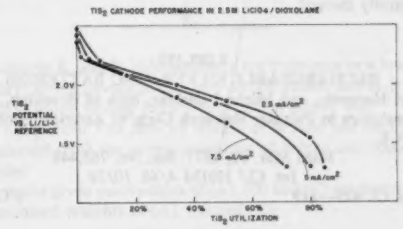
a metal pressure sleeve having both an open end and an end having a pressure applying shoulder formed thereon, said open end of said pressure sleeve at least in part encircling said first metal casing and bonded thereto at such a position that said pressure applying shoulder applies sufficient pressure to said pressure accepting shoulder of said second metal outer casing that said open ends of said first and said second metal outer casings are drawn respectively into engagement with said bottom and said top surfaces of said ceramic ring to provide liquid tight seals therebetween; and

electrical insulation means between said pressure applying shoulder and said pressure receiving shoulder for electrically insulating said first metal outer casing from said second outer metal casing.

4,091,191
BATTERY HAVING AN ELECTRODE COMPRISING MIXTURES OF Al AND TiS_2

Lewis H. Gaines, Allentown, Pa., assignor to Exxon Research & Engineering Co., Linden, N.J.

Continuation of Ser. No. 751,899, Dec. 17, 1976, abandoned, which is a continuation of Ser. No. 605,076, Aug. 15, 1975, abandoned. This application Jun. 8, 1977, Ser. No. 804,575
Int. Cl.² H01M 6/14
U.S. Cl. 429—194 **7 Claims**



1. A secondary electrochemical cell which comprises an alkali metal anode and a cathode immersed in an aprotic organic solvent having an alkali metal salt dissolved therein, the improvement which comprises: a composite cathode structure of a cathode-active material and a metal, wherein said cathode-active material consists essentially of at least one member selected from the group consisting of titanium disulfide, niobium trisulfide, titanium trisulfide, niobium triselenide, tantalum triselenide and tantalum trisulfide, and wherein said metal is at least one member selected from the group consisting of magnesium, aluminum, titanium, zinc, lead, iron, nickel and alloys thereof, said metal being reactive with the cathode-active material to form on the metal an impervious conductive film of a mixture of compounds of the cathode-active material and the metal which film remains impervious during both charging and discharging.

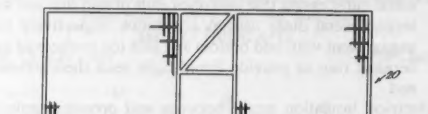
4,091,192
PAIRED BATTERY GRIDS WITH SEVERABLE BRACE, PLASTIC LUGS, AND LEAD LUG

William R. Scholle, Corona del Mar, Calif., assignor to Scholle Corporation, Northlake, Ill.

Filed Jan. 26, 1977, Ser. No. 762,756
Int. Cl.² H01M 4/02
U.S. Cl. 429—211 **9 Claims**

1. In a paired battery grid structure, an integral plastic member having a pair of side-by-side rectangular frames each with a latticework of intersecting components in a center area thereof, a severable brace extending between facing sides of said frames securing said frames in said side-by-side relationship, and a pair of severable frame lugs each extending peripherally outward from a respective outer side of each of said

frames opposite from said facing sides; a severable lead lug extending between and secured to said facing sides of said frames, and a pair of lead conductors each supported by a respective one of said frame latticeworks and each electrically connected with an end of said lead lug secured to said respective frame, said frame lugs having sufficient strength for supporting said paired grid structure therebetween, whereby two separate battery grids are obtainable by severing said frame lugs and brace from said frames, and by severing said lead lug centrally thereof.

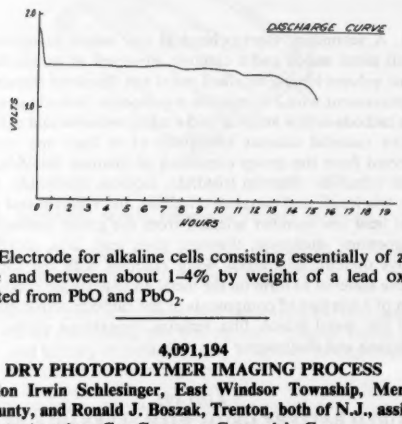


4,091,193

RECHARGEABLE SILVER-ZINC BATTERIES

Carl Horowitz, and Michael Dichter, both of Brooklyn, N.Y., assignors to Polymer Research Corp. of America, Brooklyn, N.Y.

Filed Mar. 31, 1977, Ser. No. 783,448
Int. Cl.[2] H01M *4/48, 10/24*
U.S. Cl. 429—219 **6 Claims**



1. Electrode for alkaline cells consisting essentially of zinc oxide and between about 1–4% by weight of a lead oxide selected from PbO and PbO_2.

4,091,194

DRY PHOTOPOLYMER IMAGING PROCESS

Sheldon Irwin Schlesinger, East Windsor Township, Mercer County, and Ronald J. Boszak, Trenton, both of N.J., assignors to American Can Company, Greenwich, Conn.

Division of Ser. No. 486,169, Jul. 5, 1974, Pat. No. 3,997,344. This application May 26, 1976, Ser. No. 690,309
Int. Cl.[2] C08F *8/18, 8/30, 8/40, 8/42*
U.S. Cl. 526—24 **7 Claims**

1. A composition of matter comprising, in admixture, a polymer selected from the group consisting of (a) copolymers of glycidyl acrylate and allyl glycidyl ether and (b) terpolymers of glycidyl acrylate, glycidyl methacrylate and allyl glycidyl ether containing up to about 0.25 mole of glycidyl methacrylate per mole of glycidyl acrylate, said copolymers and terpolymers having an inherent viscosity of from about 0.09 to 0.28 and an epoxide equivalent of at least about 0.64 per 100g. of polymer and, as a latent curing catalyst, an aromatic diazonium salt of a complex halogenide which decomposes upon exposure to irradiation to release a Lewis Acid effective to initiate polymerization of said copolymers and terpolymers, said diazonium salt having the formula

$$(ArN_2)_m^+ (MX_{n+m})^{-m}$$

wherein Ar is an aryl group, X is halogen, M is As, Sb, Bi, Fe, Sn, P or B, n is the oxidation state of M and m is the number of diazonium groups in the diazonium salt as determined by the net charge on the complex anion.

4,091,195

HOT-MELT ADHESIVE COMPOUND AND METHOD FOR THE PRODUCTION OF THE SAME

Robert Vitek, Maria Enzersdorf, Austria, assignor to Kores Holding Zug AG., Zug, Switzerland

Filed Jul. 28, 1976, Ser. No. 709,539
Claims priority, application Austria, Aug. 8, 1975, 6167/75
Int. Cl.[2] C09J *3/12, 3/14, 7/02, 7/04*
U.S. Cl. 526—52 **14 Claims**

1. A hot-melt adhesive compound, to be applied to a carrier in a molten state, having a molecular weight from about 100,000 to about 1,000,000, said compound consisting essentially of

a polymeric component, which is partially transversely cross-linked by cross-linkage bridges, the degree of cross-linkage being from about 0.1 to 10%, said polymeric component being selected from the group consisting of polybutadiene, polystyrene, polyisoprene, natural rubber, chlorinated butyl rubber, polyethylene, polypropylene, copolymers thereof and a mixture thereof; and

a cross-linking component forming cross-linkage bridges, selected from at least one member of the group consisting of oxygen, nitrogen, urea, urethane, and methylene.

4,091,196

METHOD FOR REPRODUCIBLY PREPARING A LOW-MELTING HIGH-CARBON YIELD PRECURSOR

Wesley E. Smith, Oak Ridge, and Bradley Napier, Jr., Powell, both of Tenn., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jun. 21, 1977, Ser. No. 808,590
Int. Cl.[2] C08F *2/02, 32/08, 132/00*
U.S. Cl. 526—73 **3 Claims**

1. A method for preparing a thermoplastic carbon precursor comprising the steps of confining indene in an autoclave containing an inert atmosphere, heating the indene to a temperature in the range of 470°–485° C. at a pressure in the range of about 1000 to 4300 psi for a duration sufficient to convert the indene to a liquid polymer, reducing the temperature and pressure to ambient conditions, and thereafter vacuum outgassing volatiles from the liquid polymer to provide a solid polymer having a melting temperature in the range of about 40°–105° C., a viscosity in the range of about 880–26,800 centipoises, and a carbon yield in the range of about 52–66 weight percent.

4,091,197

PROCESS FOR POLYMERIZATION OF VINYL CHLORIDE MICRO-SUSPENSION WITH METAL COMPOUNDS

Nicolas Fischer, 23, rue Cavendish, 75019, Paris; Jacques Boissel, 352 Parc de Cassan, 95290 L'Isle-Adam; Thomas Kemp, 57, rue Paul vaillant Couturier, 92300 Levallois-Perret, and Henri Eyer, Le Courtil Fleuri, rue de Paris, 6017 Ribecourt, all of France

Continuation of Ser. No. 476,050, Jun. 30, 1974, abandoned. This application Dec. 5, 1975, Ser. No. 637,938
Claims priority, application France, Jun. 8, 1973, 73 20882
Int. Cl.[2] C08F *2/18, 114/06, 214/06*
U.S. Cl. 526—91 11 Claims

1. A method of preparing polymers and copolymers of vinyl chloride which consists in the polymerization of the corresponding monomer or monomers in micro-suspension in the presence of a seeding product in the form of a dispersion of particles of the polymer or copolymer of vinyl chloride prepared beforehand in micro-suspension, of which the particles contain all of the organo-soluble initiator necessary for polymerization, and activating the initiator by an organo-soluble metallic complex formed throughout polymerization by reacting a water-soluble salt of a metal selected from the group consisting of iron, copper, cobalt, nickel, zinc, tin, titanium, vanadium, manganese, chromium and silver with a complexing agent progressively introduced throughout the polymerization at a rate to regulate the polymerization to maintain a relatively constant conversion rate and in which the ratio of metal salt to initiator is between 0.1 and 10.

4,091,198

SUPPRESSING GEL IN THE CONTINUOUS SOLUTION POLYMERIZATION OF A CONJUGATED DIENE WITH A MONOVINYL AROMATIC COMPOUND

Richard L. Smith; Ralph C. Farrar, and Daniel H. Willis, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sep. 10, 1976, Ser. No. 722,195
Int. Cl.[2] C08F *4/418, 4/56, 4/58*
U.S. Cl. 526—178 17 Claims

1. A continuous process for preparing a rubbery substantially random copolymer in continuous reactor means wherein monomers comprising at least one polymerizable conjugated diene and at least one copolymerizable monovinyl-substituted aromatic compound are polymerized under solution polymerization conditions of diluent, temperature, and pressure, employing an organolithium initiator, and at least one randomizing agent in an amount sufficient to substantially randomize the copolymerization of said conjugated diene and said monovinyl-substituted aromatic compound, wherein said continuous reactor means comprises a first polymerization reactor means, optionally at least one second polymerization reactor means, and a terminating reactor means, and

wherein said conjugated diene, said monovinylaromatic compound, said organolithium initiator, said randomizing agent, diluent, and at least one silicon polyhalide are added to said first polymerization reactor means, and the resulting polymerization reaction mixture moves substantially continuously through said continuous reactor means wherein the polymerization is substantially completed when the reaction mixture reaches said terminating reactor means, and said copolymer is withdrawn from said terminating reactor means, employing said silicon polyhalide in an amount effective to substantially suppress the formation of gel in said first polymerization reactor means and wherein said silicon polyhalide is a di-, tri-, or tetrahalide.

4,091,199

ACRYLONITRILE-VINYL ETHER-INDENE OR COUMARONE POLYMERS

George S. Li, Aurora, and Gary W. Dirks, Bedford Heights, both of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Dec. 20, 1976, Ser. No. 752,162
Int. Cl.[2] C08F *214/14, 214/18, 222/30, 244/00*
U.S. Cl. 526—280 4 Claims

1. The thermoplastic polymer composition resulting from the polymerization in an aqueous medium with free-radical initiation at a temperature in the range of from 0° to 100° C and in the substantial absence of molecular oxygen a mixture of

(A) from about 60 to 90% by weight of at least one nitrile having the structure

$$CH_2=\underset{\displaystyle R}{\overset{|}{C}}-CN$$

wherein R is hydrogen, a lower alkyl group having from 1 to 4 carbon atoms, or a halogen, and

(B) from about 5 to 39% by weight of a vinyl ether having the structure

$$R_1CH=\underset{\displaystyle R_2}{\overset{|}{C}}-O-R_3$$

wherein R_1 and R_2 independently are hydrogen or a lower alkyl group having from 1 to 4 carbon atoms, and R_3 is an alkyl group having from 1 to 6 carbon atoms, and

(C) from about 1 to 20% by weight of at least one member selected from the group consisting of indene and coumarone

wherein the given percentages of (A), (B) and (C) are based on the combined weights of (A), (B) and (C).

4,091,200

ETHYLENE-VINYL ACETATE COPOLYMERIZATION PROCESS

Jan Edmond Vandegaer, Pasadena, Md., assignor to Dart Industries Inc., Los Angeles, Calif.

Filed Mar. 23, 1977, Ser. No. 780,632
Int. Cl.[2] C08F *6/00, 6/26*
U.S. Cl. 528—495 11 Claims

1. In a continuous process for the production of ethylene-vinyl acetate copolymers in which

(a) ethylene and vinyl acetate are introduced to a polymerization zone;

(b) said ethylene and vinyl acetate are reacted in the presence of a free radical catalyst in said polymerization zone at elevated pressures and temperatures;

(c) the resulting reaction mixture is passed from the polymerization zone through a pressure reduction zone into a separation zone;

(d) the reaction mixture is separated into unreacted monomer and ethylene-vinyl acetate copolymer and

(e) the unreacted monomer is recycled to the polymerization zone,

the improvement which comprises: during step (c) introducing into the reaction mixture of unreacted monomer and ethylene-vinyl acetate copolymer at a location downstream from the polymerization zone a hindered phenolic compound in amounts ranging from about 6×10^{-7} moles to about 4×10^{-5} moles of phenolic nuclei per mole of total monomer feed to the polymerization zone.

4,091,201

PROCESS FOR RECOVERING ANTIBIOTICS U-50,147 AND U-51,738

Alexander D. Argoudelis, Portage, and LeRoy E. Johnson, Kalamazoo, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 684,014, May 7, 1976, Pat. No. 4,029,548.
This application Mar. 9, 1977, Ser. No. 775,857
Int. Cl.[2] C07H *15/22*
U.S. Cl. 536—17 8 Claims

1. A process for recovering antibiotic U-50,147 from a fermentation mixture f antibiotics U-50,147 and U-51,738 which comprises:

(a) filtering a fermentation beer containing antibiotic U-50,147 and antibiotic U-51,738 to obtain a clear beer;

(2) passing said clear beer over a non-ionic resin and collecting a spent filtrate;

(3) washing said resin with water and collecting an aqueous wash;

(4) combining said spent and aqueous wash and chromatographing them over a cationic exchange resin and eluting said resin with a basic solution to obtain fractions containing antibiotic U-50,147;

(5) passing said fractions containing antibiotic U-50,147 over a strongly basic anion exchange resin and eluting said resin with water and collecting fractions; and

(6) concentrating said fractions containing antibiotic U-50,147 to give an essentially pure preparation of antibiotic U-50,147.

4,091,202

N-METHANESULFONIC ACID DERIVATIVES OF 3',4'-DIDEOXYKANAMYCIN B

Hamao Umezawa; Sumio Umezawa; Shunzo Fukatsu; Shigeo Seki, all of Tokyo; Masao Murase, Kawasaki, and Shuntaro Yasuda, Yokohama, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Tokyo, Japan

Filed Sep. 16, 1976, Ser. No. 723,832
Claims priority, application Japan, Sep. 25, 1975, 50-114883
Int. Cl.[2] C07H *15/22;* A61K *31/71*
U.S. Cl. 536—10 1 Claim

1. A compound which is selected from

3',4'-dideoxykanamycin B-penta-N-methanesulfonic acid;
3',4'-dideoxykanamycin B-tri-N-methanesulfonic acid;
3',4'-dideoxykanamycin B-di-N-methanesulfonic acid;
3',4'-dideoxykanamycin B-mono-N-methanesulfonic acid;
3',4'-dideoxykanamycin B-di-N-methylmethanesulfonic acid;
3',4'-dideoxykanamycin B-penta-N-phenylmethanesulfonic acid

and alkali metal salts of these acids.

4,091,203

ADENINE DERIVATIVES

Piergiorgio Zappelli; Antonio Rossodivita; Rosario Pappa, all of Monterotondo (Rome), and Luciano Re, Rome, all of Italy, assignors to Snamprogetti, S.p.A., Milan, Italy

Filed Jul. 14, 1976, Ser. No. 705,012
Claims priority, application Italy, Jul. 15, 1975, 25419 A/75; May 4, 1976, 22958 A/76
Int. Cl.[2] C07H *19/16*
U.S. Cl. 536—26 3 Claims

1. 8-(2-carboxyethylthio) adenosine.

4,091,204

PROCESS FOR RECOVERING LINCOMYCIN FROM FERMENTATION BEER

Sharad L. Jariwala, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 534,665, Dec. 20, 1974, abandoned.
This application Sep. 24, 1976, Ser. No. 726,350
Int. Cl.[2] C12D *9/00*
U.S. Cl. 536—11 6 Claims

1. A method for partially recovering dried lincomycin from whole or screened whole fermentation beer which comprises

a. adding to the said whole or screened whole fermentation beer an inert, relatively non-volatile, relatively water immiscible organic oil to obtain an admixture which is fluid and pumpable after removal of water,

b. azeotroping off the water by heating at a temperature which maintains the biological stability of lincomycin, and

c. separating the organic oil from the dried fermentation beer solids.

4,091,205

METHOD FOR PREPARING LOW-SUBSTITUTED CELLULOSE ETHERS

Yoshiro Onda; Hiroaki Muto, both of Ogata, and Hiroshi Suzuki, Joetsu, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Japan

Filed Nov. 26, 1975, Ser. No. 635,286
Claims priority, application Japan, Nov. 28, 1974, 49-138141
Int. Cl.[2] C08B *11/20, 11/193, 11/08, 11/12, 11/02;* A61K *31/72*
U.S. Cl. 536—85 11 Claims

1. Method for preparing a cellulose ether with a molar substitution of from 0.05 to 1.0 ether groups which comprises etherifying an alkali cellulose in the presence of an etherificating agent to form a crude cellulose ether composition, neutralizing said composition in two stages: in a first stage neutralization dispersing and partly dissolving the crude cellulose ether to form a mixture in a first stage aqueous medium containing an acid in an amount equivalent to from about 5 to about 80% of the amount stoichiometrically required for the complete neutralization of all alkali groups in said mixture, in a second stage neutralization adding an additional amount sufficient to neutralize all the remaining alkali in said mixture to the said first stage aqueous medium, washing the resultant completely neutralized cellulose ether with water, drying the thus washed cellulose ether, and pulverizing the thus dried cellulose ether into finely divided powder.

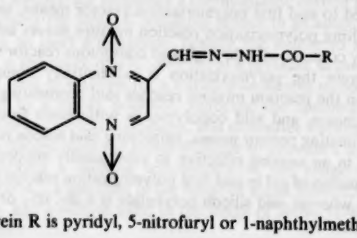
4,091,206

QUINOXALINE-1,4-DIOXIDE DERIVATIVES

Pál Benkó; Ildikó Simonek; László Pallos; Jeno Kovács, and Károly Magyar, all of Budapest, Hungary, assignors to Egyt Gyogyszervegyeszeti Gyar, Budapest, Hungary

Continuation-in-part of Ser. No. 630,762, Nov. 11, 1975, abandoned. This application Mar. 9, 1977, Ser. No. 775,999
Claims priority, application Hungary, Nov. 21, 1974, EE 2278
Int. Cl.[2] C07D *241/00, 401/12, 405/12*
U.S. Cl. 542—416 1 Claim

1. A quinoxaline-1,4-dioxide derivative of the formula



(I)

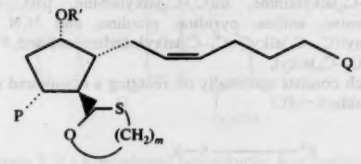
wherein R is pyridyl, 5-nitrofuryl or 1-naphthylmethyl group.

4,091,207
PROSTAGLANDIN INTERMEDIATE INCLUDING OXATHIO HETEROCYCLIC RING

Jasjit Singh Bindra, Groton, Conn., assignor to Pfizer Inc., New York, N.Y.

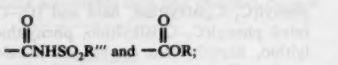
Division of Ser. No. 679,345, Apr. 22, 1976, abandoned. This application Mar. 7, 1977, Ser. No. 774,904
Int. Cl.[2] C07C *117/00*; C07D *327/04, 327/06, 411/04*
U.S. Cl. 542—429 10 Claims

1. An optically active compound of the structure



its optical antipode or the racemic mixture thereof wherein R′ is selected from the group consisting of hydrogen and

and R″ is selected from the group consisting of alkyl of from one to four carbon atoms, β-naphthyl, phenyl, p-biphenyl and phenylalkyl of from seven to nine carbon atoms; Q is selected from the group consisting of tetrazol-5-yl;



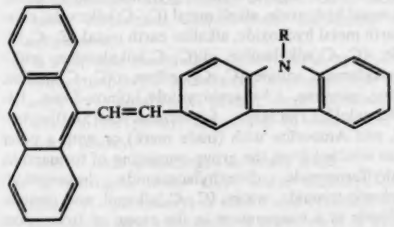
wherein R is selected from the group consisting of hydrogen, alkyl of from one to six carbon atoms, phenyl, phenylalkyl of from seven to nine carbon atoms, β-naphthyl and p-biphenyl; R‴ is alkyl of from one to four carbon atoms; *m* is 2 or 3; and P is selected from the group consisting of hydrogen, dimethyl-t-butylsilyloxy, and tetrahydropyran-2-yloxy.

4,091,208
α-(9-ANTHRYL)-β-(3-CARBAZOLYL)ETHYLENE DERIVATIVES

Mitsuo Okazaki, Tama; Akihiro Yamaguchi, Asaka, and Masaomi Sasaki, Kawasaki, all of Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed Apr. 7, 1977, Ser. No. 785,569
Claims priority, application Japan, Apr. 19, 1976, 51-44735
Int. Cl.[2] G03C *1/16*; C07D *209/82*
U.S. Cl. 542—454 2 Claims

1. α-(9-anthryl)-β-(3-carbazolyl)ethylene derivative having the formula (I):



(I)

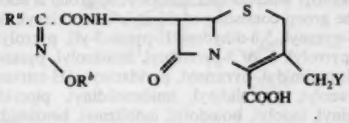
wherein R is a lower alkyl group of from 1 to 4 carbon atoms.

4,091,209
7β-[2-ETHERIFIED OXIMINO-2-(PHENYL OR NAPHTHYLACETAMIDO)]CEPHALOSPORINS HAVING A 2-HALOALKYLCARBAMOYLOXYMETHYL GROUP AT THE 3-POSITION

Martin Christopher Cook, Liverpool; Gordan Ian Gregory, Chalfont St. Peter, and Janice Bradshaw, Harrow, all of England, assignors to Glaxo Laboratories Limited, Greenford, England

Division of Ser. No. 587,065, Jun. 16, 1975, Pat. No. 4,024,137, which is a division of Ser. No. 304,524, Nov. 7, 1972, Pat. No. 3,971,778, which is a continuation-in-part of Ser. No. 252,666, May 12, 1972, abandoned. This application Jan. 26, 1977, Ser. No. 762,942
Claims priority, application United Kingdom, May 14, 1971, 15082/71; Oct. 1, 1971, 45884/71; Oct. 25, 1972, 49255/72
The portion of the term of this patent subsequent to Aug. 10, 1993, has been disclaimed.
Int. Cl.[2] C07D *501/20*
U.S. Cl. 544—16 2 Claims

1. A compound selected from the group consisting of a highly active cephalosporin antibiotic highly stable to β-lactamases, having the formula



wherein R^a is phenyl or naphthyl or each of these groups substituted by chloro, bromo, iodo, fluoro, hydroxy, lower alkyl, nitro, amino, loweralkylamino, diloweralkylamino, lower alkanoyl, lower alkanoylamino, lower alkoxy, lower alkylthio or carbamoyl;

R^b is lower alkyl or cycloalkyl containing 3–7 carbon atoms;

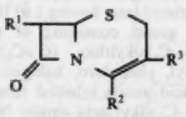
Y is a group of formula $—OCO.NH(CH_2)_mD$ wherein *m* is an integer from 1–4 and D is chlorine, bromine, iodine or fluorine, said cephalosporin antibiotic being in the form of a syn isomer free of the corresponding anti isomer to the extent of at least 75% based on the total weight of said antibiotic; and a physiologically acceptable salt thereof.

4,091,210
PREPARATION OF 3-ALKYL-3-CEPHEM-4-CARBOXYLIC ACID COMPOUNDS FROM DITHIO ISOPROPENYL AZETIDINE CARBOXYLIC COMPOUNDS

Takashi Kamiya, Suita; Tsutomu Teraji; Masashi Hashimoto, both of Toyonaka; Osamu Nakaguti, Osaka, and Teruo Oku, Kyoto, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 401,145, Sep. 27, 1973, abandoned. This application Apr. 6, 1976, Ser. No. 674,234
Claims priority, application Japan, Oct. 20, 1972, 47-105558; Nov. 27, 1972, 47-119114; Dec. 13, 1972, 47-125574
Int. Cl.[2] C07D *501/02*
U.S. Cl. 544—18 4 Claims

1. A process for the preparation of the compound of a formula:



(I)

wherein

R^1 is substituted amino selected from the group consisting of hydrazino, mono- or di-(C_1–C_6)alkylamino, mono- or di-(C_2–C_6)alkenylamino, mono- or di-(C_2–C_6)al-

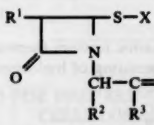
kylideneamino, phenyl(C_1–C_6)-alkylideneamino and acylamino wherein said acyl radical is selected from the group consisting of (C_1–C_6)alkanoyl, (C_3–C_6)alkenoyl, (C_3–C_6)alkynoyl, cyclo(C_5–C_8)alkanecarbonyl, cyclo(C_5–C_8)alkyl(C_2–C_6)alkanoyl, dihydrobenzoyl, dihydrophenyl(C_2–C_6)alkanoyl, (C_1–C_6)alkoxy(C_2–C_6)alkanoyl, (C_1–C_6)alkylthio(C_2–C_6)alkanoyl, (C_2–C_6)alkenylthio(C_2–C_6)alkanoyl, cyclo(C_5–C_8)alkylthio(C_2–C_6)alkanoyl, cyclo(C_5–C_8)alkoxy(C_2–C_6)alkanoyl, dihydrophenoxy(C_2–C_6)alkanoyl, dihydrophenylthio(C_2–C_6)alkanoyl, (C_1–C_6)alkoxycarbonyl, cyclo(C_3–C_8)alkyl(C_1–C_6)alkoxycarbonyl, cyclo(C_5–C_8)alkoxycarbonyl dihydrophenoxycarbonyl, phenylcarbamoyl, benzoyl, toluoyl, naphthoyl, α-methylnaphthoyl, benzenesulfonyl, tetrahydronaphthoyl, indancarbonyl, phenyl(C_2–C_6)alkanoyl, tolyl(C_2–C_6)alkanoyl, xylyl(C_2–C_6)alkanoyl, naphthyl(C_2–C_6)-alkanoyl, tetrahydronaphthyl(C_2–C_6)alkanoyl, indanyl(C_2–C_6)alkanoyl, phenoxy(C_2–C_6)alkanoyl, xylyloxy(C_2–C_6)alkanoyl, phenoxycarbonyl, xylyloxycarbonyl, naphthyloxycarbonyl, indanyloxycarbonyl, phenyl(C_1–C_6)alkoxycarbonyl, phenylthio(C_2–C_6)alkanoyl, phenylglyoxyloyl, heterocyclic carbonyl, heterocyclic(C_2–C_6)alkanoyl, heterocyclic (C_1–C_6)alkoxycarbonyl, heterocyclic-oxycarbonyl, heterocyclicoxy(C_2–C_6)alkanoyl, heterocyclic-thio(C_2–C_6)alkanoyl wherein said heterocyclic group is selected from the group consisting of thienyl, benzothienyl, furyl, 2- or 4-pyranyl, 5,6-dihydro-2H-pyran-3-yl), pyrrolyl, 2- or 3H-pyrrolyl, 2- or 3-pyrrolinyl, imidazolyl, pyrazolyl, pyridyl, pyrimidyl, pyrazinyl, pyridazinyl, 1H-tetrazolyl, 2H-tetrazolyl, pyrrolidinyl, imidazolidinyl, piperidino, piperazinyl, indolyl, isoindolyl, indolizinyl, benzimidazolyl, quinolyl, isoquinolyl, 1- or 2H-indazolyl, 1- or 2H-benzotriazolyl, oxazolyl, isoxazolyl, oxadiazolyl, sydnonyl, thiazolyl, thiadiazolyl, benzoxazolyl, benzoxadiazolyl, benzothiazolyl, and benzothiadiazolyl; the above recited acyl group having from 1 to 10 of the substituents selected from the group consisting of (C_1–C_6) alkyl, (C_2–C_6)alkenyl, cyclo(C_3–C_8)alkyl, (C_1–C_6)alkoxy, (C_1–C_6)alkylthio phenyl, xylyl, tolyl, indanyl, phenyl(C_1–C_6) alkyl, halogen, halophenyl, halophenoxy, cyano, (C_1–C_6)alkylsulfinyl, (C_1–C_6)alkanesulfonyl, (C_1–C_6)alkoxycarbonyl(C_1–C_6)alkoxy, cyclo(C_3–C_8)alkyl(C_1–C_6)alkoxycarbonyl(C_1–C_6)alkoxy, nitro, sulfo, amino, azido, mercapto, carboxy, hydroxy, hydroxyamino, and mono- or di-(C_1–C_6)alkylamino, said above recited acyl group having a functional group selected from the group consisting of amino, hydroxy, mercapto and carboxy, wherein said functional group is protected by a conventional protecting group;

R^2 is carboxy or protected carboxy, wherein said protected carboxy is an ester in which the ester moiety is selected from the group consisting of tri(C_1–C_6)alkylsilyl, (C_1–C_6)alkyl, cyclo(C_3–C_8)alkyl(C_1–C_6)alkyl, (C_2–C_6)alkenyl, (C_2–C_6)alkynyl, cyclo(C_5–C_8)alkyl, (C_1–C_6)alkoxy(C_1–C_6)alkyl, (C_1–C_6)alkylthio(C_1–C_6)alkyl, di(C_1–C_6)alkylamino, (C_1–C_6)alkylideneamino, (C_1–C_6)alkylsulfenyl(C_1–C_6)alkyl, phenyl, xylyl, tolyl, naphthyl, indanyl, dihydroanthryl, phenyl(C_1–C_6)alkyl, phenoxy(C_1–C_6)alkyl, phenylthio(C_1–C_6)alkyl, phenylsulfenyl(C_1–C_6)alkyl, (C_1–C_6)alkanoyloxy(C_1–C_6)alkyl, benzoyl(C_1–C_6)alkyl, phthalimido, pyridyl, piperidino, 2-pyridon-1-yl, tetrahydropyranyl, quinolyl, pyrazolyl, heterocyclic(C_1–C_6)alkyl, wherein said heterocyclic group is selected from the group consisting of pyridyl, piperidino, 2-pyridon-1-yl, tetrahydropyranyl, quinolyl, and pyrazolyl; the above recited protected carboxy ester having 1 to 10 substituents selected from the group consisting of (C_1–C_6)alkyl, (C_1–C_6)alkoxy, (C_1–C_6)alkylthio, (C_1–C_6)alkylsulfinyl, (C_1–C_6)alkanesulfonyl, phenylazo, halogen, cyano, hydroxy, and nitro; acid amide selected from the group consisting of N-(C_1–C_6)alkyl acid amide, N,N-di(C_1–C_6)alkyl acid amide, N-phenyl acid amide, and acid amide with pyrazole, imidazole, 4-(C_1–C_6)alkylimidazole; acid anhydride selected from the group consisting of acid anhydride of di(C_1–C_6)alkyl phosphate, dibenzylphosphate, phosphoric acid halide, di(C_1–C_6)alkyl phophite, sulfurous acid, thiosulfuric acid, sulfuric acid, (C_1–C_6)alkyl carbonate, hydrazoic acid, hydrohalogenic acid, (C_1–C_6)alkanoic acid, (C_3–C_6)alkenoic acid, halo(C_2–C_6)alkanoic acid, halo(C_3–C_6)alkenoic acid, phenyl(C_2–C_6)alkanoic acid, phenoxy(C_2–C_6)alkanoic acid, furanacetic acid, thiopheneacetic acid, benzoic acid, and symmetric acid anhydride;

acid salt selected from the group consisting of the alkali metal salt, alkaline earth metal salt, and a salt with an organic amine selected from the group consisting of (C_1–C_6)alkylamine, di(C_1–C_6)alkylamine, tri(C_1–C_6)alkylamine, aniline, pyridine, picoline, and N,N -bis[-phenyl(C_1–C_6)alkyl]-(C_1–C_6)alkylenediamine, and

R^3 is (C_1–C_6)alkyl,

which consists essentially of: reacting a compound of the formula:



(II)

wherein R^1, R^2 and R^3 are each as defined above, and

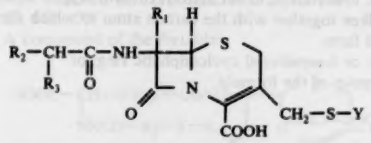
X is a residue of a thiol compound selected from the group consisting of (C_1–C_6)alkylthio, (C_2–C_6)alkenylthio, (C_1–C_6)alkoxy(C_1–C_6)alkylthio, phenyl(C_1–C_6)alkylthio, xylyl(C_1–C_6)alkylthio, halophenyl(C_1–C_6)alkylthio, nitrophenyl(C_1–C_6)alkylthio, mono- or di-(C_1–C_6)alkoxyphenyl(C_1–C_6)alkylthio, halo and (C_1–C_6)alkoxy substituted phenyl(C_1–C_6)alkylthio, phenylthio, xylylthio, tolylthio, naphthylthio, mono- or di-halophenylthio, nitrophenylthio, mono- or di-(C_1–C_6)alkoxyphenylthio, halo and nitro substituted phenylthio, heterocyclic thio wherein said heterocyclic group is selected from the group consisting of thienyl, furyl, pyrrolyl, pyridyl, imidazolyl, triazolyl, tetrazolyl, pyrrolidinyl, piperazinyl, piperidinyl, homopiperazinyl, quinolyl, isoquinolyl, benzimidazolyl, oxazolyl, oxadiazolyl, oxatriazolyl, thiazolyl, thiadiazolyl, thiatriazolyl, benzoxazolyl and benzothiazolyl, the above recited heterocyclic group having 1 to 6 substituents selected from the group consisting of (C_1–C_6)alkyl, (C_1–C_6)alkoxy, halogen, nitro, phenyl, tolyl, xylyl, halophenyl, nitrophenyl, and phenyl(C_1–C_6)alkyl, with a condensing agent selected from the group consisting of (C_1–C_6)alkanoic acid, (C_1–C_6)alkanesulfonic acid, benzenesulfonic acid, toluenesulfonic acid, benzoic acid, hydrohalogenic acid, hydrazoic acid, carbonic acid, sulfuric acid, phosphoric acid, nitric acid, hydrocyanic acid, perchloric acid, boron trifluoride, a metal salt of the above recited acid wherein said metal is selected from the group consisting of alkali metal, alkaline earth metal, silver, copper, and mercury, mercury oxide, cuprous oxide, methyl iodide, an organic amine salt of the above recited acid wherein said organic amine is selected from the group consisting of (C_1–C_6)alkylamine, di(C_1–C_6)alkylamine, tri(C_1–C_6)alkylamine, aniline, toluidine, (C_1–C_6)alkylaniline, di(C_1–C_6)alkylaniline, pyridine, and picoline, alkali metal hydroxide, alkali metal (C_1–C_6)alkoxide, alkaline earth metal hydroxide, alkaline earth metal (C_1–C_6)alkoxide, (C_1–C_6)alkylamine, di(C_1–C_6)alkylamine, tri(C_1–C_6)alkylamine, aniline, (C_1–C_6)aniline, di(C_1–C_6)aniline, pyridine, picoline, 1,5-diazabicyclo[4,3,0]non-5-ene, 1,4-diazabicyclo[2,2,2]octane, 1,8-diazabicyclo[5,4,0]undecene-7, and Amberlite with (trade mark) or with a polar solvent selected from the group consisting of formamide, dimethylformamide, dimethylacetamide, hexamethylphosphoric triamide, water, (C_1–C_6)alkanol, and dimethylsulfoxide at a temperature in the range of from room temperature to that resulting from the reaction mixture being heated to effect ring closure of compound (II).

4,091,211
CEPHALOSPORINS

Marc Montavon, and Roland Reiner, both of Basel, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Jun. 13, 1975, Ser. No. 586,677
Claims priority, application Switzerland, Jun. 21, 1974, 8537/74; May 5, 1975, 5743/75; May 29, 1975, 6915/75
Int. Cl.[2] A61K *31/545;* C07D *501/36*
U.S. Cl. 544—21 28 Claims

1. A compound of the formula:



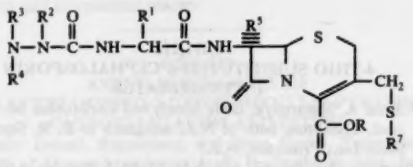
wherein Y is a 6 membered heterocyclic ring containing 1 to 3 nitrogen atoms at least one of which is adjacent to a carbonyl group, said heterocyclic ring containing one or more ring substituents and being characterized by being non-aromatic and not enolizable to an aromatic form; R_1 is hydrogen or methoxy; R_3 is hydrogen, hydroxy, hydroxymethyl, amino, azido, carboxy or sulfo and R_2 is a heteroaromatic group selected from the group consisting of pyridyl, pyrimidinyl, 2-thienyl, 2-furyl, 1-tetrazolyl, 1-triazolyl, 1-pyrazolyl and 3-sydnonyl which heteroaromatic group may be substituted with hydroxy, halo, lower alkyl or lower alkoxy
and pharmaceutically acceptable salts and hydrates thereof.

4,091,212
HYDRAZINOCARBONYLAMINO CEPHALOSPORINS 3-HETEROCYCLICTHIO 7-HYDRAZINOCARBONYLAMINO ACETYLAMINO CEPHALOSPORINS

Hermann Breuer, and Uwe D. Treuner, both of Regensburg, Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Nov. 26, 1976, Ser. No. 745,156
Int. Cl.[2] C07D *501/36*
U.S. Cl. 544—27 17 Claims

1. A compound of the formula



wherein

R is hydrogen, lower alkyl, phenyl-lower alkyl, diphenyl-lower alkyl, trihaloethyl, tri(lower alkyl)silyl, tri(lower alkyl) stannyl or a salt forming ion of the group consisting of aluminum, alkali metal, alkaline earth meta, cyclo-lower alkylamine, dicyclo-lower alkylamine or lower alkylamine;

R^1 is hydrogen, lower alkyl, thienyl, furyl, pyridyl, cyclobutyl, cyclopentyl, cyclohexyl, cyclopentenyl, cyclohexenyl, cyclohexadienyl, phenyl, mono-substituted phenyl wherein the phenyl substituent is halo, lower alkyl or lower alkoxy;

R^2 and R^3 each is hydrogen or lower alkyl;

R^4 is hydrogen, lower alkyl, lower alkanoyl, halo-lower alkanoyl, cyanoacetyl or substituted cyanoacetyl wherein the cyanoacetyl substituent is lower alkyl or cyclo-lower alkyl;

R^5 is hydrogen or methoxy;

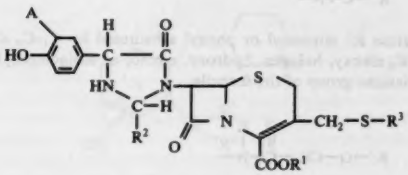
R^7 is unsubstituted or mono-substituted tetrazolyl, thiadiazolyl, oxadiazolyl, triazolyl, thiazolyl, or oxazolyl wherein the substituent is lower alkyl.

4,091,213
7-CYCLIZEDAMINO-3-HETEROTHIOMETHYL CEPHALOSPORIN DERIVATIVES

Murray A. Kaplan, Syracuse; William J. Gottstein, Fayetteville, and Alphonse P. Granatek, Baldwinsville, all of N.Y., assignors to Bristol-Myers Company, New York, N.Y.

Division of Ser. No. 640,317, Dec. 12, 1975, abandoned. This application Jan. 10, 1977, Ser. No. 758,229
The portion of the term of this patent subsequent to May 31, 1994, has been disclaimed.
Int. Cl.[2] C07D *501/36;* A61K *31/545*
U.S. Cl. 544—27 71 Claims

1. A compound of the formula



wherein

A is hydrogen, hydroxy, methyl or methoxy,

R^1 is hydrogen, sodium or potassium,

R^2 is a member selected from the group consisting of 2-furan-5-sulfonic acid, phenyl-2-sulfonic acid, 4-methoxyphenyl-3-sulfonic acid, 4-hydroxyphenyl-3-sulfonic acid, 2-carboxymethoxyphenyl, 4-carboxymethoxyphenyl, 3-hydroxy-4-carboxyphenyl, 4-(2′-carboxy)vinylphenyl, 2-carboxyphenyl and 3-carboxyphenyl in the form of its sodium or potassium salt, and

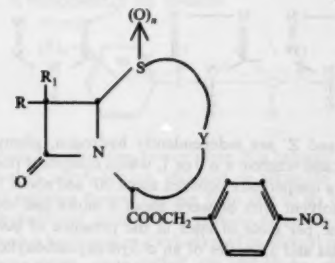
R^3 is tetrazol-5-yl, 1,2,4-thiadiazol-5-yl, 1,3,4-thiadiazol-2-yl, 1,3,4-oxadiazol-3-yl or 1,2,4-triazol-5-yl, each of such groups being unsubstituted or substituted with one or two lower alkly groups of one to four carbon atoms.

4,091,214
DE-ESTERIFICATION PROCESS FOR CEPHALOSPORINS

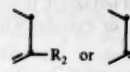
Lowell D. Hatfield, Bargersville, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Feb. 25, 1977, Ser. No. 772,153
Int. Cl.[2] C07D *501/20, 501/04*
U.S. Cl. 544—30 11 Claims

1. The process for de-esterifying a cephalosporin p-nitrobenzyl ester of the formula

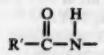


wherein Y is the group (a) or (b) of the formulas

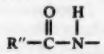


(a) (b)

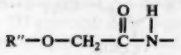
R is H_2N—, H_3N^+, phthalimido, succinimido; or an acylamino group of the formula



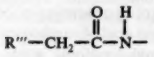
wherein R′ is hydrogen, C_1–C_4 alkyl, or cyanoacetyl; an acylamino group of the formula



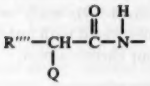
wherein R″ is phenyl or phenyl substituted by C_1–C_4 alkyl, C_1–C_4 alkoxy, halogen, hydroxy, amino, or aminomethyl; an acylamino group of the formula



wherein R″ has the same meanings as defined above; an acylamino group of the formula

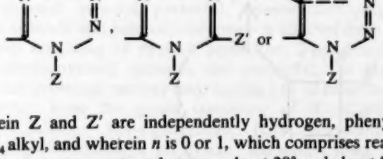


wherein R‴ is R″ as defined above and in addition is 2-thienyl, 3-thienyl, 2-furyl, or 1-tetrazyl; or an α-substituted acylamino group of the formula

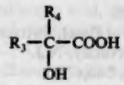


wherein R⁗ is R″ and in addition is 2-thienyl, 3-thienyl, or 2-furyl, Q is —OH, $—NH_2$, $—NH_3^+$, —COOH, or $—SO_3H$; R_1 is hydrogen, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 alkylthio, carboxy, or hydroxy; R_2 is hydrogen, C_1–C_4 alkyl, C_1–C_4 alkoxy, halogen, phenyl, C_1–C_4 alkoxymethyl, C_1–C_4 alkylthiomethyl, or a heterocyclic-thiomethyl group of the formula

wherein R_5 is



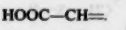
wherein Z and Z′ are independently hydrogen, phenyl, or C_1–C_4 alkyl, and wherein *n* is 0 or 1, which comprises reacting said ester at a temperature between about 20° and about 75° C. in an inert solvent with between about 3 moles and about 4 moles of zinc per mole of ester in the presence of between about 3 moles and 15 moles of an α-hydroxycarboxylic acid per mole of said ester, wherein said acid is an α-hydroxycarboxylic acid of the formula



wherein R_4 is hydrogen, methyl, ethyl, phenyl, or phenyl substituted by halogen, lower alkyl, lower alkoxy, or hydroxy; and R_3 is hydrogen, methyl, ethyl, carboxymethyl, hydroxy-substituted carboxymethyl, phenyl, or phenyl-substituted by halogen, lower alkyl, lower alkoxy, or hydroxy; or R_3 and R_4 when taken together with the carbon atom to which they are attached form

a. a 5- or 6-membered cycloaliphatic ring; or

b. a group of the formula



4,091,215

7-D-α-AMINO-α-(P-ACETOXYPHENYL)ACETAMIDO-3-METHYL-3-CEPHEM-4-CARBOXYLIC ACID

Daniel Bouzard, Franconville, and Abraham Weber, Paris, both of France, assignors to Bristol-Myers Company, New York, N.Y.

Division of Ser. No. 581,054, May 27, 1975, Pat. No. 4,012,382. This application Feb. 22, 1977, Ser. No. 770,876

Claims priority, application United Kingdom, Jun. 5, 1974, 24848/74

Int. Cl.² C07D *501/22*

U.S. Cl. 544—30 **1 Claim**

1. The compound 7-D-α-amino-α-(p-acetoxyphenyl-)acetamido-3-methyl-3-cephem-4-carboxylic acid when substantially free of the L-isomer.

4,091,216

4-THIO SUBSTITUTED-Δ²CEPHALOSPORIN INTERMEDIATES

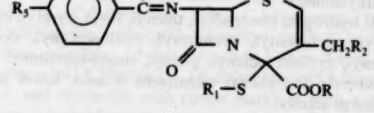
William A. Slusarchyk, Belle Mead, and Christopher M. Cimarusti, Hamilton, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 632,618, Nov. 17, 1975, Pat. No. 4,039,534. This application May 16, 1977, Ser. No. 797,110

Int. Cl.² C07D *501/20*

U.S. Cl. 544—30 **4 Claims**

1. A compound of the formula:



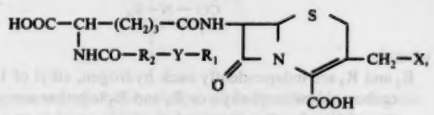
wherein R is lower alkyl, 2,2,2-trichloroethyl, p-methoxybenzyl, p-nitrobenzyl, or diphenylmethyl; R_1 is lower alkyl or phenyl; R_2 is hydrogen or acetoxy, R_4 is methyl or ethyl; and R_5 is hydrogen, methyl or methoxy.

4,091,217
7-((5'-N-METHYLTHIOACETAMIDO)-ADIPOAMIDO)-CEPHALOSPORIN DERIVATIVES

Toshiyasu Ishimaru, D-14, 2-7, Momoyamadai, Suita, and Mariko Kawabata, 9-4, Tachibanacho-1 chome, Toyonaka, both of Japan

Division of Ser. No. 580,965, May 27, 1975, Pat. No. 4,036,833. This application Dec. 9, 1976, Ser. No. 748,756
Claims priority, application Japan, May 28, 1974, 49-61296; Jul. 3, 1974, 49-76771
Int. Cl.² C07D *501/22, 501/28, 501/40*
U.S. Cl. 544—30 9 Claims

1. A compound of the formula:



wherein R_1 is a lower alkyl, phenyl or benzyl group, R_2 is a lower alkylene group, Y is a sulfur atom or a sulfinyl group and X is a hydrogen atom, an acetoxy group, or an azido group, and adducts thereof with quinoline or isoquinoline.

4,091,218
MORPHOLINE PROCESS

Prem S. Advani, Conroe, Tex., assignor to Texaco Development Corporation, New York, N.Y.

Filed Dec. 29, 1975, Ser. No. 644,696
Int. Cl.² C07D *295/02*
U.S. Cl. 544—106 6 Claims

1. In the process comprising catalytically reacting in a morpholine reactor a dialkylene glycol with ammonia in the presence of hydrogen to produce a morpholine compound and gaseous streams containing hydrogen, methane and ammonia, the improvement which comprises:

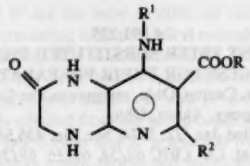
(a) contacting the gaseous streams with the dialkylene glycol feed to absorb ammonia from the gas stream;
(b) recovering a liquid stream of the dialkylene glycol rich in ammonia;
(c) recovering hydrogen overhead in a gas stream lean in ammonia; and
(d) recycling said hydrogen gas stream lean in ammonia back to said morpholine reactor.

4,091,219
AMINO DERIVATIVES OF 1,2,3,4-TETRAHYDRO-2-OXOPYRIDO[2,3-B]-PYRAZINE CARBOXYLIC ACIDS AND ESTERS

Theodor Denzel, Regensburg, and Hans Hoehn, Tegernheim, both of Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 769,633, Feb. 17, 1977. This application Sep. 12, 1977, Ser. No. 832,146
Int. Cl.² C07D *471/04*
U.S. Cl. 544—117 5 Claims

1. A compound of the formula



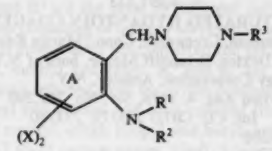
wherein R and R^2 each is hydrogen or lower alkyl; R^1 is morpholino-lower alkylene, thiamorpholino-lower alkylene, piperazino-lower alkylene or piperidino-lower alkylene; and physiologically acceptable acid addition salts thereof.

4,091,220
MORPHOLINOCARBONYL ALKYL N-BENZYLPIPERAZINES

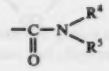
Toshihiro Ishiguro, and Yasushi Sanno, both of Osaka, Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 633,546, Nov. 19, 1975, abandoned. This application May 3, 1977, Ser. No. 793,356
Claims priority, application Japan, Nov. 19, 1974, 49-133281
Int. Cl.² C07D *413/02*
U.S. Cl. 544—121 10 Claims

1. A compound of the formula



wherein R^1 and R^2 are the same or different and each stands for a hydrogen atom, alkylcarbonyl, whose alkyl moiety is of 1 to 3 carbon atoms, or benzoyl; R^3 stands for straight-chain or branched alkyl having 1 to 6 carbon atoms which is substituted by amino-carbonyl represented by the formula



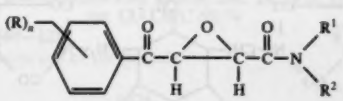
wherein R^4 and R^5 form a morpholino ring together with the nitrogen atom adjacent thereto, and X stands for a halogen atom, and a pharmaceutically acceptable acid addition salt thereof.

4,091,221
3-(BENZOYL)OXIRANECARBOXAMIDES

John B. Carr, and Harry G. Durham, both of Modesto, Calif., assignors to Shell Oil Company, Houston, Tex.

Filed Mar. 17, 1977, Ser. No. 778,536
Int. Cl.² C07D *413/02, 303/36*
U.S. Cl. 544—147 1 Claim

1. A compound of the formula:



wherein *n* is zero, one, two or three, R is halogen, nitro, trifluoromethyl, alkyl, alkoxy, alkanoyl or alkamido in which the alkyl moieties thereof contain from one to six carbon atoms, methylsulfonyl, methylsulfonylamino or halobenzoyl, R^1 and R^2 each is hydrogen or alkyl, alkenyl or alkynyl of up to sixteen carbon atoms, or together are $-(CH_2)_4-$, $-(CH_2)_5-$, or $-C_2H_4-O-C-C_2H_4-$, the compound having the trans-isomeric configuration

4,091,222

2,2 DISUBSTITUTED-BENZODIOXOLES

Elso Manghisi, Via Baracca 12, Monza; Aldo Salimbeni, Via Strambio 11, Milan, and Pietro Mennella, Lomagna, Como, all of Italy

Division of Ser. No. 495,147, Aug. 6, 1974, Pat. No. 3,970,672. This application Jul. 9, 1976, Ser. No. 704,102

Claims priority, application Italy, Aug. 9, 1973, 27736 A/73; Jul. 4, 1974, 24811 A/74

Int. Cl.[2] C07D *413/12*

U.S. Cl. 544—148 2 Claims

1. A benzodioxole which is 2-methyl-2-(β-morpholinoethoxyethyl)-1,3-benzodioxole and its pharmaceutically acceptable salts.

4,091,223

UNSATURATED HYDANTOIN COAGENTS

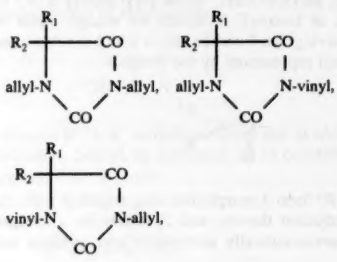
Hyman W. Zussman, Greenwich, Conn.; Martin Knell, Ossining, and Martin Dexter, Briarcliff Manor, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

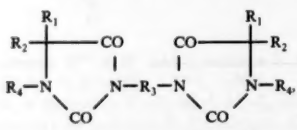
Filed Aug. 4, 1976, Ser. No. 711,200

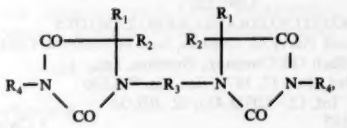
Int. Cl.[2] C07D *233/74, 233/80*

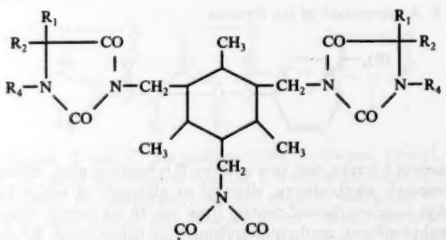
U.S. Cl. 548—308 10 Claims

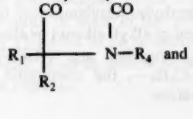
1. An unsaturated hydantoin of the formula selected from the group consisting of











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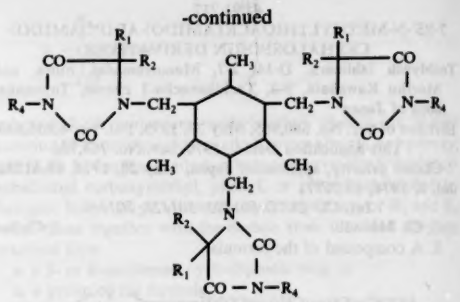


wherein

R_1 and R_2 are independently each hydrogen, alkyl of 1 to 6 carbon atoms or phenyl, or R_1 and R_2 together are alkylene of 4 to 6 carbon atoms,

R_3 is alkylene of 1 to 6 carbon atoms, 3-oxapentamethylene, 2-allyloxytrimethylene or p-xylylene, and

R_4 is vinyl or allyl.

4,091,224

ALKOXY IMIDAZOLINES

Hans Peter Panzer, Stamford; Michael Niall Desmond O'Connor, Norwalk, and Louis J. Baccei, Farmington, all of Conn., assignors to American Cyanamid Company, Stamford, Conn.

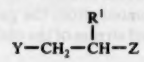
Division of Ser. No. 467,332, May 6, 1974, Pat. No. 4,007,200. This application Sep. 23, 1976, Ser. No. 725,755

The portion of the term of this patent subsequent to Feb. 8, 1994, has been disclaimed.

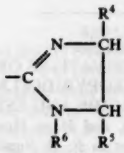
Int. Cl.[2] C07D *233/22*

U.S. Cl. 548—353 10 Claims

1. A compound having the formula



wherein Y is R^2O, R^2 being alkyl (C_1–C_{10}), R^1 is hydrogen or methyl and Z is



wherein m is 0 or 1, X is halogen, R^4 and R^5 are, individually, hydrogen, alkyl (C_1–C_4), aryl (C_6–C_{10}), aralkyl (C_7–C_{11}) or alkaryl (C_7–C_{11}) and R^6 is alkyl (C_1–C_4), aryl (C_6–C_{10}), aralkyl (C_7–C_{11}) or alkaryl (C_7–C_{11}).

4,091,225

ANTIOXIDANT ESTER SUBSTITUTED PHENOLS AND PROCESS FOR THEIR PREPARATION

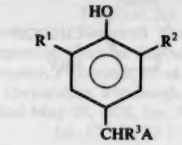
Dane K. Parker, Canton, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jan. 22, 1974, Ser. No. 435,568

Int. Cl.[2] C07C *69/54, 69/16, 69/28*

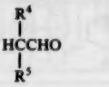
U.S. Cl. 560—20 9 Claims

1. A process comprising (a) reacting in an inert atmosphere a compound having the general structural formula



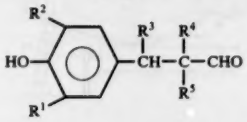
(I)

with a compound having the general formula



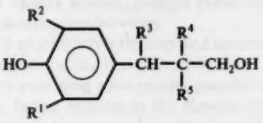
(II)

in the presence of a basic catalyst while dissolved in an organic solvent to yield an aldehyde having the structural formula



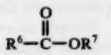
(III)

(b) separating and reducing the aldehyde to form an alcohol having the general structural formula



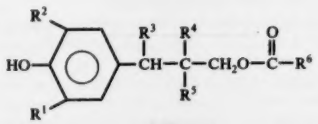
(IV)

(c) separating the alcohol and reacting it with an ester forming compound selected from the group consisting of methyl acrylate, methyl methacrylate, ethyl acrylate and a compound of the general formula



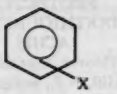
(V)

while in the presence of a transesterification catalyst to yield (d) an ester with the structural formula



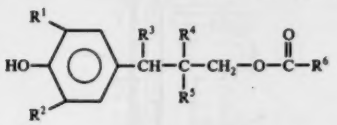
(VI)

wherein R^1 and R^2 are the same or different radicals selected from the group consisting of tertiary alkyl radicals having from 4 to 12 carbon atoms, R^3 is selected from the group consisting of hydrogen, methyl and ethyl, A is selected from the group consisting of chloro and bromo, R^4 and R^5 are the same or different radicals selected from the group consisting of methyl, ethyl, n-propyl and n-butyl and R^6 is selected from the group consisting of methyl, ethyl, propyl and butyl, aralkyl radicals having from 7 to 12 carbon atoms, vinyl, 2-propenyl and aryl radicals having the general formula

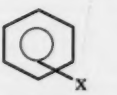


wherein X is selected from the group consisting of hydrogen, amino, nitro, chloro, bromo and alkyl radicals having from 1 to 17 carbon atoms and wherein R^7 is an alkyl radical having from 1 to 10 carbon atoms.

2. Compounds having the general formula



wherein R^1 and R^2 are the same or different radicals selected from the group consisting of tertiary alkyl radicals having from 4 to 12 carbon atoms, R^3 is selected from the group consisting of hydrogen, methyl and ethyl, R^4 and R^5 are the same or different radicals selected from the group consisting of methyl, ethyl, n-propyl and n-butyl and R^6 is selected from the group consisting of methyl, ethyl, propyl and butyl, aralkyl radicals having from 7 to 12 carbon atoms, vinyl, 2-propenyl and aryl radicals having the general formula



wherein X is selected from the group consisting of hydrogen, amino, nitro, chloro, bromo and alkyl radicals having from 1 to 17 carbon atoms.

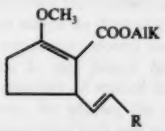
4,091,226

NOVEL CYCLOPENTENECARBOXYLATES

Jean Buendia, Nogent-sur-Marne, and Michel Vivat, Lagny-sur-Marne, both of France, assignors to Roussel Uclaf, Paris, France

Filed Dec. 2, 1976, Ser. No. 746,824
Claims priority, application France, Dec. 18, 1975, 75 38838
Int. Cl.[2] C07C *69/74*
U.S. Cl. 560—122 **3 Claims**

1. A compound of the formula



wherein AlK is alkyl of 1 to 4 carbon atoms and R is selected from the group consisting of —CHO and —CH_2OH.

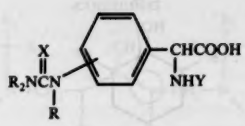
4,091,227

PROTECTED α-AMINO-α-UREIDO(THIOUREIDO)PHENYLACETIC ACIDS

John Russel Eugene Hoover, Glenside, Pa., and Jerry Arnold Weisbach, Cherry Hill, N.J., assignors to SmithKline Corporation, Philadelphia, Pa.

Division of Ser. No. 357,763, May 7, 1973, Pat. No. 4,007,173.
This application Oct. 10, 1976, Ser. No. 728,581
Int. Cl.[2] C07C *127/19, 157/09*
U.S. Cl. 560—9 10 Claims

1. A compound of the formula

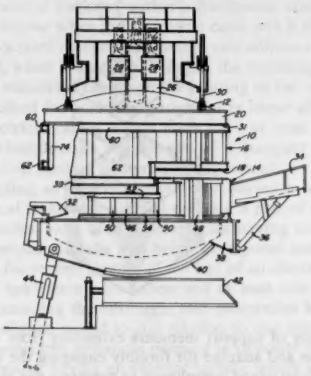


where:
the R_2NCXNR group is at the para or meta position;
R is hydrogen or lower alkyl of 1–4 carbon atoms;
X oxygen or sulfur; and
Y is a easily removable protecting group.

4,091,228
WATER COOLED SHELL FOR ELECTRIC ARC FURNACES

Joseph L. Brown, Jr., Hopewell Township, Beaver County; Dominic Fragomeni, Brighton Township, Beaver County, and James J. Trageser, Pittsburgh, all of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

Filed May 19, 1976, Ser. No. 687,589
Int. Cl.[2] F27D *1/12*
U.S. Cl. 13—32 8 Claims



1. For use in a furnace having an interior enclosed by a bottom, a top and at least one upstanding side wall, means for fluid cooling said side wall comprising:

a pair of closely spaced, parallel plates defining a coolant flow passage therebetween;

a plurality of intermittently disposed spacers for maintaining the desired spacing between said plates;

said plates extending substantially parallel with said furnace wall in facing relation to the furnace interior to dispose said coolant flow passage in heat transfer relation therewith;

a pair of oppositely spaced inlet and outlet manifolds coextensive with the ends of said plates and communicating each with one end of said flow passage, said manifolds being box-like headers defined on three sides by rectangularly disposed members and in which said plates extend between and attach the remote members of said headers to define the fourth side thereof,

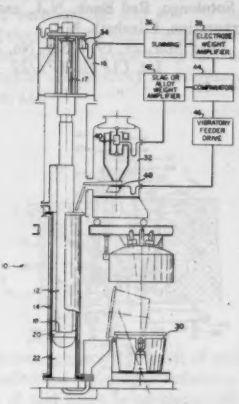
means forming openings in said manifolds for supplying coolant fluid to said inlet manifold for passing the same through said flow passage to discharge from said outlet manifold.

4,091,229
SLAG AND ALLOY FEEDING BASED ON ELECTRODE WEIGHT

Patrick J. Wooding, Moorestown, N.J., and Edgar V. Weir, Butler, Pa., assignors to Wooding Corporation, Moorestown, N.J.

Filed Mar. 1, 1977, Ser. No. 773,333
Int. Cl.[2] H05B *7/148*
U.S. Cl. 13—33 3 Claims

1. In an electroslag melting furnace system having a consumable electrode and a supply of additive material adapted to be supplied to the melting furnace as the electrode is being melted, the improvement comprising means for weighing said electrode as it is being melted and means for controlling the

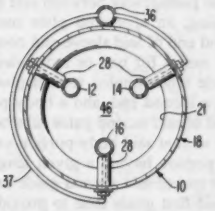


addition of said additive material in response to said weighing means.

4,091,230
EVAPORATION-COOLED TRANSMISSION LINE SYSTEM

Mario Rabinowitz, Menlo Park, Calif., and James Joseph Pachot, Portland, Oreg., assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Aug. 9, 1976, Ser. No. 713,066
Int. Cl.[2] H01B *7/34*
U.S. Cl. 174—15 C 27 Claims



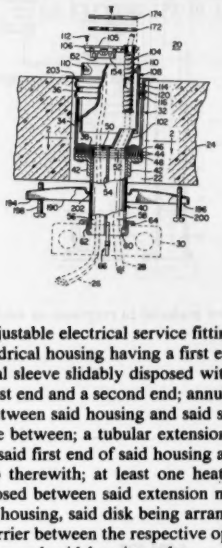
1. An elecrical power transmission system comprising: a number of tubular electrical conductors; shield means surrounding the conductors to permit an electric field to be established therebetween, the space between the shield means and each conductor adapted to receive a dielectric medium to prevent voltage breakdown therebetween; a source of liquid coolant; a first conduit means for directing liquid coolant from said source to each conductor; second conduit means for directing coolant vapor to said source for liquification; and means at each of a plurality of spaced locations along each conductor, respectively, for placing the corresponding conductor in fluid communication with said second conduit means to allow the venting of coolant vapor thereto to assure that the coolant will be substantially only in a liquid phase in the conductors.

4,091,231

ADJUSTABLE FLOOR RECEPTACLE

Thomas J. Sotolongo, Red Bank, N.J., assignor to Thomas & Betts Corporation, Elizabeth, N.J.

Filed Mar. 29, 1977, Ser. No. 782,532
Int. Cl.[2] H02G 3/22
U.S. Cl. 174—48 **16 Claims**



1. An adjustable electrical service fitting assembly comprising: a cylindrical housing having a first end and a second end; a cylindrical sleeve slidably disposed within said housing and having a first end and a second end; annular seal ring elements disposed between said housing and said sleeve to provide seal means there between; a tubular extension member coupled at one end to said first end of said housing and aligned in coaxial relationship therewith; at least one heat expandable annular disk interposed between said extension member and said first end of said housing, said disk being arranged to provide a fire resistant barrier between the respective openings in said extension member and said housing when exposed to an elevated temperature; an elongate metallic partition longitudinally disposed in said extension member to longitudinally divide the interior of said extension member into two separate compartments; a first guide tube coupled adjacent said first end of said housing and having a first end and a second end, said first end of said first guide tube communicating with one of said compartments of said extension member, said second end of said first guide tube opening into the interior of said housing to provide an enclosed passageway between said extension member and said housing; an apertured plate member disposed adjacent said second end of said sleeve and coupled thereto to provide mounting means for one or more electrical receptacles; a second guide tube coupled to said plate member and having a first end, a second end, and a body portion therebetween, said first end of said second guide tube being coupled to said plate member so that said body portion extends into said sleeve, said body portion having a given length arranged to permit said second end of said second guide tube to telescopingly mate with said first guide tube to provide a continuous enclosure about a cable extending within said first guide tube and said second guide tube; and means coupled to said extension member for locking said fitting to a structural member.

4,091,232

LOW MICROPHONIC CIRCUIT HOUSING

Gerd Gerry Lenk, Arlington Heights, and Robert Allen Paul, Hanover Park, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

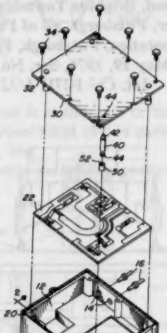
Filed Jul. 19, 1976, Ser. No. 706,417
Int. Cl.[2] H05K 5/04
U.S. Cl. 174—52 R **5 Claims**

1. A low microphonic housing assembly for an electrical circuit fabricated on a board, the assembly comprising:

a housing with a provided cavity for receiving the supporting the board therein;

a cover portion adapted to be affixed to said housing to cover said housing cavity, said housing being a single cast unit of a high acoustically dampening material;

means for affixing the cover portion to the housing;



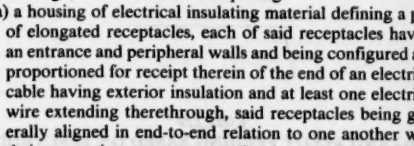
a plurality of support members extending from said cover portion and adapted for forcibly engaging the board with a predetermined compliance to constrain the same against the housing when the cover is affixed, via the affixing means, to the housing.

4,091,233

ELECTRICAL CONNECTOR AND METHOD OF CONNECTING AN ELECTRICAL CABLE TO SAME

Alfred J. Berman, 5715 Kelvin Ave., Woodland Hills, Los Angeles, Calif. 91364

Filed Aug. 23, 1976, Ser. No. 716,791
Int. Cl.[2] H01R 5/02, 13/38, 9/08
U.S. Cl. 174—88 R **12 Claims**



1. A compact electrical connector for quickly and easily connecting to one another in linear alignment the ends of a pair of electrical cables each having at least one wire extending therethrough, said connector comprising:

(a) a housing of electrical insulating material defining a pair of elongated receptacles, each of said receptacles having an entrance and peripheral walls and being configured and proportioned for receipt therein of the end of an electrical cable having exterior insulation and at least one electrical wire extending therethrough, said receptacles being generally aligned in end-to-end relation to one another with their respective entrances opening in opposite directions, said housing having an exterior surface which is not substantially larger in transverse cross-section than the transverse cross-section of the exterior surface of the cables;

(b) at least one prong of electrically conductive material disposed within each of said receptacles, said prongs being electrically connected to one another, each of said prongs being elongated and having a pointed end, each of said prongs extending generally longitudinally of its associated receptacle with said pointed end facing the entrance into the associated receptacle; each of said prongs being dis-

posed generally intermediate the peripheral walls of its associated receptacle so as to be aligned with the wire in the associated electrical cable when that electrical cable is inserted into the associated receptacle, whereby each of said prongs is imbedded into the associated cable when that cable is inserted into the associated receptacle to thereby establish physical and electrical connection between the wires of the cables and the respective prongs,

(c) adhesive means disposed within each said receptacle for bonding the associated cable end to the housing, each said adhesive means comprising a quantity of flowable adhesive material enclosed within a fracturable container for ready release when the associated cable end is disposed in the associated receptacle, whereby said adhesive will form a bond, when it solidifies, between the insulating material of the associated cable and the housing of the connector.

11. A method for connecting together in linear alignment a pair of electrical cables which each have at least one wire extending therethrough by the use of a compact electrical connector, said method comprising the steps of:

(a) providing an electrical connector having a housing of electrical insulating material defining a pair of elongated receptacles, each of said receptacles having an entrance and peripheral walls and being configured and proportioned for receipt therein of the end of an electrical cable which has exterior insulation and at least one electrical wire extending therethrough; said receptacles being generally aligned in end-to-end relation to one another with their respective entrances opening in opposite directions, said housing having an exterior surface which is not substantially larger in transverse cross-section than the transverse cross-section of the exterior surface of the cables; there being at least one prong of electrically conductive material disposed within each of said receptacles, said prongs being electrically connected to one another, each of said prongs being elongated and having a pointed end, each of said prongs extending generally longitudinally of its associated receptacle with said pointed end facing the entrance ino the associated receptacle, each of said prongs being disposed generally intermediate the peripheral walls of its associated receptacle; so as to be aligned with the wire in the associated cable when that cable is inserted into the associated receptacle,

(b) disposing adhesive means within each of said receptacles, each of said adhesives means comprising a quantity of flowable air-drying adhesive material enclosed within a fracturable container,

(c) for each receptacle, inserting one end of an electrical cable into said receptacle so as to imbed the associated prong end into the end of the cable to thereby establish physical and electrical contact and connection between the wire of the cable and the prong,

(d) for each receptacle, effecting the fracture of the adhesive container between the cable and the connector so as to release the flowable adhesive material into the receptacle, and

(e) allowing said adhesive in each receptacle to solidify so as to form a bond between the insulation of the two cables and the housing of the connector.

4,091,234

JOYSTICK WITH ATTACHED CIRCUIT ELEMENTS

Stephen D. Bristow, Santa Clara, Calif., assignor to Atari, Inc., Sunnyvale, Calif.

Filed Mar. 30, 1977, Ser. No. 782,976

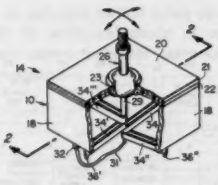
Int. Cl.[2] G08C *21/00*

U.S. Cl. 178—18 **6 Claims**

1. An improved joystick of the type having an operating shaft mounted on a base with a ball and socket joint and means for converting the displacement of the operating shaft into corresponding electrical signals, wherein the improvement comprises:

(a) an arm attached to the ball in the ball and socket joint and operatively connected to the operating shaft;

(b) a plurality of independent, electrically conductive rubber loops connected between the arm and the base so that displacement of the operating shaft causes deformation of at least one of the loops, the loops being each adapted for varying in electrical conductivity in correspondence to said deformation; and



(c) an electrical circuit connected to each of said loops for measuring the individual variation in resistance of each of the loops, each of said loops being electrically independent of the other loops, whereby the displacement of the operating shaft is converted into corresponding electrical signals.

4,091,235

PRINTER AND CONTROL CIRCUIT THEREFOR

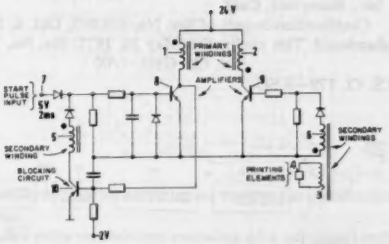
Emil Johan Nijenhuis, Voorburg, Netherlands, assignor to De Staat Der Nederlanden, Te Dezen Vertegenwoordigd Door De Directeur-Generaal Der Posterijen, Telegrafie En Telefonie, The Hague, Netherlands

Filed Mar. 31, 1977, Ser. No. 783,408

Claims priority, application Netherlands, Apr. 1, 1976, 7603408

Int. Cl.[2] H04L *21/00;* B41J *9/10*

U.S. Cl. 178—23 R **7 Claims**

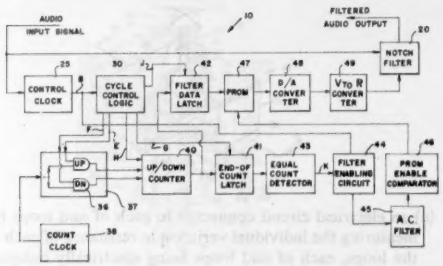


1. Printer, comprising: a printing element which, when in operating position, is placed in a magnetic field, and which can carry currents; a transformer connected to said element and having two primary windings; a circuit having two amplifiers, one connected to each of said primary windings, whereby, after a start pulse, two current pulses of opposite directions are generated by said amplifiers which are successively supplied to the transformer, the second pulse effecting the printing movement of said element; the input of the circuit and the amplifiers being coupled one to another in such a way that the start pulse controls one of the amplifiers, which in its turn controls the other amplifier.

4,091,236
AUTOMATICALLY TUNABLE NOTCH FILTER AND METHOD FOR SUPPRESSION OF ACOUSTICAL FEEDBACK

Chun-Fu Chen, North Canton, Ohio, assignor to The University of Akron, Akron, Ohio

Filed Sep. 7, 1976, Ser. No. 720,842
Int. Cl.[2] H03G 5/16; H04M 1/20
U.S. Cl. 179—1 FS **22 Claims**



1. An apparatus for suppression of acoustical feedback in an audio input signal having a variable period comprising:

notch filter means for receiving and selectively filtering the audio input signal, said notch filter means having a center frequency which is variable over at least a substantial portion of the audio frequency spectrum,

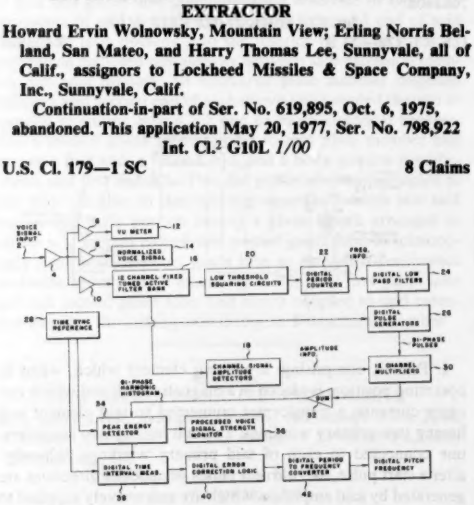
means to determine the presence of periodicity within the audio input signal and providing an output signal indicative thereof, and

means for receiving the signal from said means to determine the presence of periodicity and selectively tuning said notch filter means to a center frequency substantially equal to the instantaneous dominant frequency of the audio input signal.

4,091,237
BI-PHASE HARMONIC HISTOGRAM PITCH EXTRACTOR

Howard Ervin Wolnowsky, Mountain View; Erling Norris Belland, San Mateo, and Harry Thomas Lee, Sunnyvale, all of Calif., assignors to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.

Continuation-in-part of Ser. No. 619,895, Oct. 6, 1975, abandoned. This application May 20, 1977, Ser. No. 798,922
Int. Cl.[2] G10L 1/00
U.S. Cl. 179—1 SC **8 Claims**



1. A digital voice pitch extractor comprising:

first means for amplifying the electrical signal representative of speech;

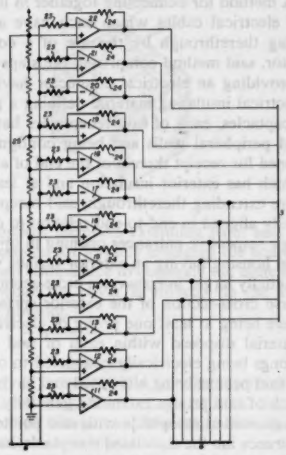
second means connected to said first means for filtering the said electrical signal and for separating said electrical signal into individual harmonics of the pitch frequency of the said electrical signal;

third means connected to said second means and responsive to said individual harmonics for forming a bi-phase harmonic histogram and deriving the fundamental frequency of said electrical signal.

4,091,238
AUTOMATIC TELEPHONE CALL COMPUTER AND DISPLAY

Ira Samuels, Metuchen, and Sidney Barzman, Tenafly, both of N.J., assignors to Beacon Computer Corp., Metuchen, N.J.

Filed Dec. 10, 1976, Ser. No. 749,516
Int. Cl.[2] H04M 15/12
U.S. Cl. 179—7.1 R **10 Claims**



1. An apparatus for calculating and displaying information relative to the cost of a telephone call while it is in progress including:

means responsive to an adjustable signal applied thereto for providing a coded signal indicative of the relative locations of a calling party and a called party;

non-linear digital to analog converting means responsive to said coded signal for providing an analog signal;

a signal controlled oscillator responsive to said analog signal for providing a pulse train related to said analog signal;

means for counting said pulse train; and

display means responsive to said counting means for displaying information relative to the cost of a telephone call while it is in progress.

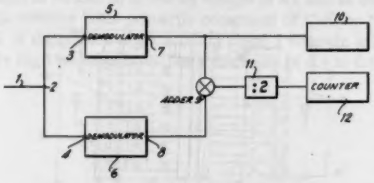
4,091,239
BIT ERROR RATE PERFORMANCE MONITOR UNITS IN DIGITAL TRANSMISSION LINKS

Gilbert P. Lainey, 7, rue Hebert, 92140 Clamart, and Jean-Claude A. Imbeaux, 69, rue Dunois, 75646 Paris Cedex, both of France

Filed Mar. 15, 1977, Ser. No. 777,740
Claims priority, application France, Mar. 17, 1976, 76 08289
Int. Cl.[2] H04J 3/14
U.S. Cl. 179—15 BF **2 Claims**

1. A bit error rate performance monitor unit for use in a digital transmission link having a receiving end and an operative output end comprising first and second demodulators having substantially the same structure, means connecting the receiving end of said data transmission link to the inputs of said demodulators, means connecting the operative output end to the output of said first demodulator, a module-2 adder having its inputs respectively connected to the outputs of said demod-

ulators, a counter, and a divider-by-2 interconnecting the output of said adder with the input of said counter, whereby the



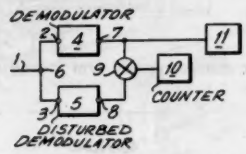
bit error rate can be determined from the counter reading divided by the operation period.

4,091,240

BIT ERROR RATE PERFORMANCE MONITOR UNITS IN DIGITAL TRANSMISSION LINKS

Gilbert P. Lainey, 7, rue Hebert, 92140 Clamart, and Daniel R. Duponteil, 45, rue Anatole, 92370 Chaville, both of France

Filed Mar. 15, 1977, Ser. No. 777,739
Claims priority, application France, Mar. 17, 1976, 76 08288
Int. Cl.[2] H04J 3/14
U.S. Cl. 179—15 BF **10 Claims**



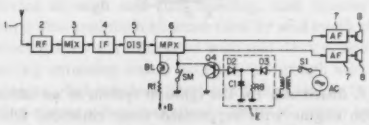
1. A bit error rate performance monitor unit for use in a digital transmission link having a receiving end and an operative output end, comprising first and second demodulators having substantially the same structure, means connecting the receiving end of said data transmission link to the inputs of said demodulators, means connecting the operative output end to the output of said first demodulator, a module-2 adder having its inputs respectively connected to the outputs of said demodulators, a counter connected to the output of said adder, and means reproducibly disturbing the operation of said second demodulator, whereby the bit error rate can be determined from the counter reading divided by the operation period.

4,091,241

STEREO INDICATING CIRCUIT FOR AN FM RECEIVER

Kaku Sakaida, Tokyo, Japan, assignor to Trio Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 15, 1976, Ser. No. 750,857
Claims priority, application Japan, Dec. 19, 1975, 50-172068[U]
Int. Cl.[2] H04H 5/00
U.S. Cl. 179—15 BT **4 Claims**



1. A stereo indicating circuit for use with an FM receiver comprising

a multiplex demodulator responsive to a composite stereo signal;

a stereo-monaural mode selector switch for switching said receiver to either the stereo or monaural mode of operation;

a stereo indicator lamp which is lit when said receiver is in said stereo mode of operation and which is off when said receiver is in said monaural mode of operation;

an AC power source;

a first switch connected to said AC power source for de-energizing said receiver when said first switch is opened; and

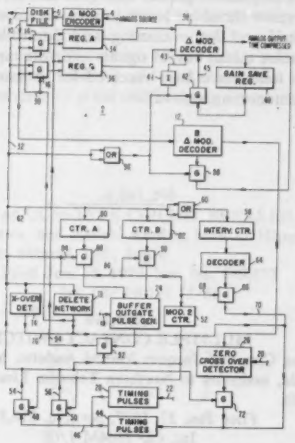
means responsive to said first switch being opened to place said receiver in its monaural mode of operation and thereby turn said stereo indicator lamp off when said receiver is de-energized.

4,091,242

HIGH SPEED VOICE REPLAY VIA DIGITAL DELTA MODULATION

Francis Paul Carrubba, North Haven, Conn.; Walter Edgar Daniels, Jr., Mohegan Lake, and Peter Anthony Franaszek, Ossining, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 11, 1977, Ser. No. 814,591
Int. Cl.[2] G11B 13/00
U.S. Cl. 179—15.55 T **5 Claims**



1. In a delta modulator audio replay system, the combination comprising:

means for delta modulation encoding of a provided audio signal;

means for determining the positive and negative zero crossovers of the delta modulation encoded audio signal;

means for selectively deleting portions of the delta modulation encoded audio signal which occur between zero crossovers having the same sign, and which occur in a predetermined timing sequence;

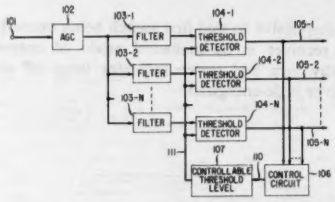
means for storing the delta modulation encoded audio signal which has had portions selectively deleted therefrom; and

means for delta modulation decoding of the stored delta modulation encoded signal which has had portions selectively deleted therefrom, including means for joining the undeleted decoded portions, with said undeleted decoded portions having the same gain factor where joined.

4,091,243
MULTIFREQUENCY SIGNAL RECEIVER

Albert Mizrahi, Tinton Falls; Neal John Moyer, Red Bank, and David August Pezzutti, Lincroft, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jul. 26, 1977, Ser. No. 819,112
Int. Cl.[2] H04M *1/50*
U.S. Cl. 179—84 VF 9 Claims



1. Apparatus for detecting reception of multifrequency signals of the type including a plurality of filters for passing individual multifrequency tones of a gain adjusted received signal, wherein the improvement comprises:

controllable threshold detector means in circuit relationship with the plurality of filters for generating output signals indicative of individual received multifrequency tones having amplitudes greater than prescribed threshold levels; and

control means for generating signals to control said controllable threshold detector means for detecting signals which have amplitudes greater than first and second prescribed reference threshold levels in accordance with prescribed criteria and for evaluating said controllable threshold detector means output signals to determine whether only two tones have been received for at least a prescribed minimum time interval.

4,091,244
MULTIPLE CONTACT SWITCH

Pak-Jong Chu, and Jacques Marcel Audette, both of Ottawa, Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Jun. 27, 1977, Ser. No. 810,525
Int. Cl.[2] H04M *1/08*
U.S. Cl. 179—158 R 7 Claims

1. A multi-contact switch for a telephone set, comprising:

a base member mounted on one part of said telephone set;

a plurality of contact areas on said base member, spaced across said base member;

a plurality of elongate cantilever spring contact members extending side-by-side over said base member, a contact member related to each contact area;

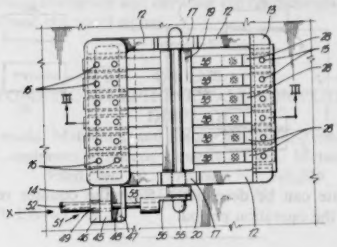
a contact portion on each contact member, the contact portion over the related contact area, the contact members resiliently biased away from said base member;

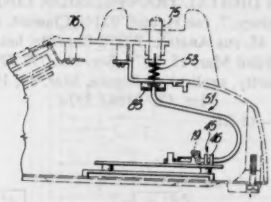
a rotary cam member mounted over said spring contact members, the rotary axis of the cam member extending normal to the longitudinal axes of the spring contact members;

cam surfaces on said rotary cam member, a cam surface for each spring contact member;

an arm extending radially at one end of said cam member;

a remote actuating member mounted on said telephone set at a position remote from said base member;



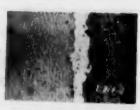


means for connecting said arm to said remote actuating member.

4,091,245
DISTRIBUTOR ELECTRODE ASSEMBLY HAVING OUTER RESISTIVE LAYER FOR SUPPRESSING NOISE

Yoshiro Komiyama, Okazaki; Katsumi Kondo, Toyota; Yoichiro Asano, Toyota, and Mituo Ando, Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Division of Ser. No. 588,051, Jun. 18, 1975, Pat. No. 3,992,230.
This application Jul. 6, 1976, Ser. No. 702,938
Claims priority, application Japan, Jun. 26, 1974, 49-72274; Feb. 3, 1975, 50-13472
Int. Cl.[2] H01H *19/00, 1/00*
U.S. Cl. 200—19 R 2 Claims



1. A distributor for the ignition system of an internal combustion engine with suppressed noise emission, which comprises a rotor and a plurality of stationary terminals operably arranged around and in close proximity to a circular locus defined by the rotation of said rotor, said rotor, when it rotates, being capable of successively forming a suitable gap for spark discharge between its electrode and an electrode of each of said stationary terminals, characterized in that at least one of

said electrode of the rotor and said electrode of each terminal comprise a substrate made of brass or steel, an intermediate layer made of nickel aluminide comprising 80 to 97% by weight of Ni and 20 to 3% by weight of Al, and an electrically high resistive layer primarily composed of CuO or NiO.

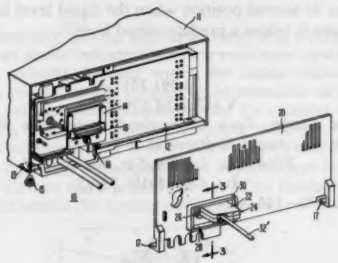
2. A distributor as set forth in claim 1 wherein said electrically high resistive layer has a thickness of 0.1 to 0.6 mm.

4,091,246

ENCRYPTION DEVICE INTERLOCK

Frank Carl Donofrio, Norristown, and Angelo Richard DiPietro, Philadelphia, both of Pa., assignors to Burroughs Corporation, Detroit, Mich.

Filed Mar. 28, 1977, Ser. No. 781,931
Int. Cl.² H01H *9/20*
U.S. Cl. 200—50 B **9 Claims**



1. An interlock system for use with a cable assembly in a security-type electronic device comprising:

access cover means,

said cover means including a well-like structure having outwardly projecting sides, the innermost portion of said well having two sections, a first of said sections being comprised substantially of a first opening through said cover means, the second of said sections having a second opening and at least one additional recessed opening therein,

an interlock plate having a generally "U" shaped configuration, the opposite legs of said plate having respective slotted sections,

said cable assembly to be interlocked including connector means, said connector means having oppositely disposed flanges for respective positioning within said slotted sections of said interlock plate,

fastener means operative through said recessed opening in said second well section for affixing said cover means to said device, the combined interlock plate/cable assembly being subsequently operatively disposed within said well, said connector means being accessible from within said device through said first opening, said fastener means being obscured from external view by said interlock plate,

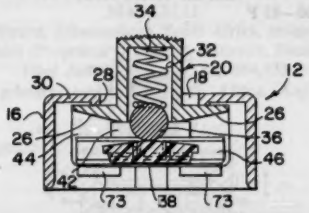
an electrical switch associated with said device, said switch having actuating means protruding through said second opening, said interlock plate contacting said switch actuating means when operatively disposed within said well and establishing thereby a predetermined electrical condition within said device which permits the input and storage of security-type information, the removal of said interlock plate with its cable assembly terminating said electrical condition, and resulting in the destruction of the stored information.

4,091,247

DOUBLE POLE-DOUBLE THROW SWITCH

Martin Gaber, 2301 Greenwood, Wilmette, Ill. 60091

Filed Jun. 14, 1976, Ser. No. 695,937
Int. Cl.² H01H *21/00*
U.S. Cl. 200—67 G **13 Claims**



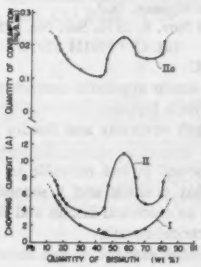
1. In a switch construction comprising a base, spaced-apart contacts having exposed contact surfaces attached to said base, at least one fulcrum contact positioned on said base between said spaced-apart contacts, said fulcrum contact extending outwardly from said base beyond the extent of said spaced-apart contacts, a bridging contactor engaging said fulcrum contact and extending on either side of the fulcrum contact for engagement with one or the other of said spaced-apart contacts upon pivoting movement of the bridging contactor, and a spring-loaded actuator for pivoting said bridging contactor, the improvement wherein said bridging contactor comprises a substantially non-resilient elongated member, said actuator including a substantially non-resilient rocker engaging said bridging contactor and being mounted for pivoting movement relative to said bridging contactor, operation of said actuator resulting in pivoting movement of said rocker relative to said bridging contactor whereby said rocker is driven against said bridging contactor to pivot said bridging contactor.

4,091,248

VACUUM-TYPE CIRCUIT BREAKER

Hideo Arakawa, and Keiichi Kuniya, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Jun. 24, 1975, Ser. No. 589,673
Int. Cl.² H01H *33/66*
U.S. Cl. 200—144 B **7 Claims**

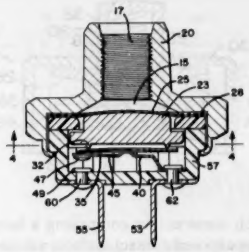


1. A vacuum-type circuit breaker comprising an evacuated container, a pair of contacts provided in said container, and means to open and close said contacts for circuit breaking, characterized in that said contacts are made of an alloy material containing 0.1 to 20 weight % of a Pb-Bi alloy containing either 18 to 45 weight % Bi or 65 to 80 weight % Bi, 2 to 50 weight % of at least one of either cobalt or iron, the balance being essentially copper.

4,091,249
PRESSURE SENSITIVE ELECTRICAL SWITCH HAVING A SNAP ELEMENT

John William Huffman, Kettering, Ohio, assignor to Emerson Electric Co., St. Louis, Mo.

Filed Oct. 6, 1976, Ser. No. 730,136
Int. Cl.[2] H01H *35/34*
U.S. Cl. 200—83 P 10 Claims



1. A pressure responsive electrical switching device for changing switching state in response to fluid pressure changes, comprising:

inlet means for receiving fluid,

pressure responsive means of predetermined area, adjacent said inlet means, for transmitting a force in response to the pressure of the fluid,

snap disc means peripherally mounted and actuatable from a first state in which a first surface of said snap disc means is convex to a second state in which said first surface is concave,

disc actuating means, contacting said snap disc means on said first surface only at points positioned outwardly from the center of said snap disc means by a predetermined radius, for receiving a force transmitted by said pressure responsive means and for applying said force to said snap disc means, and,

switch means, responsive to the movement of the center of said snap disc means as said disc means assumes said first state or said second state, for assuming first or second switching states, respectively.

4,091,250
ELECTRO-MECHANICAL LIQUID LEVEL SENSOR

Hemming Siiberg, Summit, N.J., assignor to Wagner Electric Corporation, Parsippany, N.J.

Filed Nov. 8, 1976, Ser. No. 739,810
Int. Cl.[2] H01H *35/18*
U.S. Cl. 200—84 C 11 Claims

1. Liquid level sensor apparatus comprising:

(a) a container for a liquid;

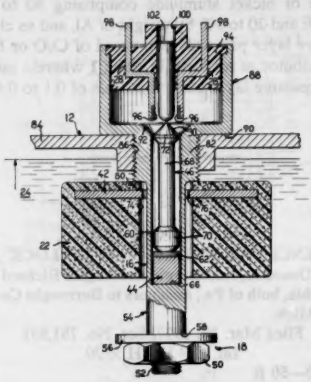
(b) a hollow shaft vertically and fixedly positioned in said container;

(c) a rod positioned in and movable in said hollow shaft between a first position and a second position one of which closes an electrical circuit and the other of which opens an electrical circuit;

(d) a float assembly exterior of and about the said hollow shaft and movable up and down along said hollow shaft in response to the liquid level in said container;

(e) first and second magnetic members magnetically attractable to each other, one said magnetic member being carried by said float assembly and movable therewith and the other said magnetic member being in said hollow shaft in a position to raise said rod when said member is magnetically attracted;

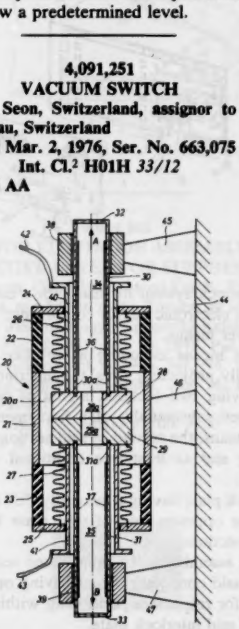
(f) the magnetic attraction between said members being insufficient to move said rod when the liquid level is above a predetermined level whereby the rod remains in its first position but being sufficient to effect the raising of said rod into its second position when the liquid level in said container is below a predetermined level.



4,091,251
VACUUM SWITCH

Joachim Amsler, Seon, Switzerland, assignor to Sprecher & Schuh AG, Aarau, Switzerland

Filed Mar. 2, 1976, Ser. No. 663,075
Int. Cl.[2] H01H *33/12*
U.S. Cl. 200—146 AA 9 Claims



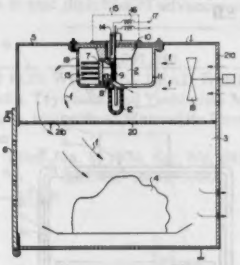
1. A vacuum switch employing an evacuated housing, first and second contact element means arranged within said housing, said contact element means being in contact with one another during the closed condition of the switch and being disconnectable from one another for current cut-off, said switch including: said first contact element means being movable in one direction, support means, said first contact element means being secured to said support means, guiding means disposed externally of said housing for guiding the said support means for movement in the direction of movement of said first contact element means, said support means being of substantially hollow cylindrical construction and secured to the said first contact element means at a position opposite said second contact element means; and a current terminal separate from said support means cooperating with said first contact element means.

4,091,252

MICROWAVE HEATING APPARATUS

Tokuju Koinuma, Kawasaki, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Jun. 8, 1976, Ser. No. 693,889
Claims priority, application Japan, Jun. 9, 1975, 50-68531
Int. Cl.[2] H05B 9/06
U.S. Cl. 219—10.55 R 8 Claims



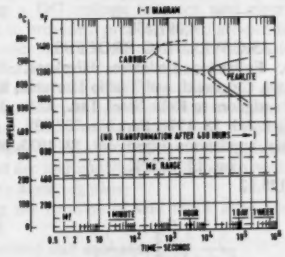
1. A microwave heating apparatus comprising a magnetron including an anode cylinder in which resonance cavities are defined, a cathode disposed within the anode cylinder, an output antenna electrically coupled to the resonance cavities of the anode cylinder and a magnet device for creating a magnetic field in the anode cylinder; a heating oven chamber for receiving a substance to be heated; and a magnetron operating device for operating a magnetron, the improvement in which the output antenna and a greater portion of the anode cylinder are disposed within the heating oven chamber.

4,091,253

APPLYING A HARD FACING TO AN IRON OR STEEL FORMER

Trevor Bagshaw, and John McCann, both of Sheffield, England, assignors to British Steel Corporation, London, England

Division of Ser. No. 503,940, Sep. 9, 1974, Pat. No. 3,975,610.
This application Mar. 5, 1976, Ser. No. 664,288
Claims priority, application United Kingdom, Sep. 17, 1973, 43447/73
Int. Cl.[2] B23K 9/04
U.S. Cl. 219—76.14 4 Claims



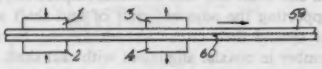
1. A method of applying a hard facing to an iron or steel former comprising melting a consumable electrode and a flux on to the former by a submerged arc welding process and moving the former and the welding head relative to one another to deposit a bead of heat-treatable martensitic stainless steel weld metal on the former, the consumable electrode and the flux being chosen to give a said deposited weld metal comprising, by weight, from 0.10% to 0.25% carbon, up to 1.0% silicon, up to 2.0% manganese, from 1.5% to 3.0% nickel, from 10.0% to 15.0% chromium from 0.5% to 2.0% molybdenum, from 0.1% to 0.5% vanadium, from 0.1% to 0.5% niobium, the balance being iron and impurities, and the nickel/chromium/molybdenum ratios being balanced to achieve an optimum microstructure of not greater than 10% deltaferrite in the interdendritic regions thereof.

4,091,254

APPARATUS FOR WELDING HEAT FUSIBLE MATERIAL

Friedrich Struve, Johannesburg, South Africa, assignor to Gundle Plastics (Proprietary) Limited, Edenvale, South Africa

Filed Jun. 9, 1976, Ser. No. 694,433
Claims priority, application South Africa, Aug. 5, 1975, 75/5040
Int. Cl.[2] B23K 11/08
U.S. Cl. 219—79 10 Claims



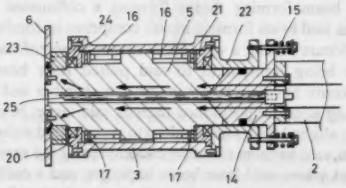
1. Welding apparatus for producing an ultimately continuous weld line between sheets of heat fusible material, said apparatus comprising a supporting frame, at least two pairs of welding electrodes, means for mounting each pair of said welding electrodes on said supporting frame, said mounting means including means for moving the electrodes of a said pair relative to each other between a clamping position and a disengaged position, each said mounting means being movable along a predetermined path on said supporting frame in a material advancing direction together with material being welded by said respective electrode pairs and in the opposite direction, means for moving the material to be welded along said paths in the material advancing direction with one pair of electrodes being in the clamping position and with the other of said pair in the disengaged position and moving in said opposite direction, means for activating each said pairs of electrodes to carry out a welding cycle while each said pair of electrodes is being moved in the material advancing direction along their respective paths, one pair of electrodes being located to form a series of collinear spaced line welds and the other pair being located to form line welds which join the said series to thereby from a continuous line weld.

4,091,255

ELECTRODES IN WELDING MACHINES

Mamoru Yamamoto, Chofu, Japan, assignor to Sanki Kogyo Kabushiki Kaisha, Japan

Filed Mar. 8, 1976, Ser. No. 664,548
Claims priority, application Japan, Mar. 25, 1975, 50-36162
Int. Cl.[2] B23K 11/06
U.S. Cl. 219—84 2 Claims



1. An electrode mechanism for a seam welding machine and the like, comprising

a frame,

an electrode shaft rotatably mounted in said frame and having a curvilinear contact surface on one end thereof,

an electrode roller fixed to the opposite end of said shaft and projecting outside of the frame,

contact means secured against rotation on said frame and

abutting against the contact surface on said shaft at said one end thereof,

a resilient conductor adapted to be connected at one end thereof to an electric source and connected at another end thereof to the aforementioned contact means,

said contact means comprising a cylindrical contact member having on one end a curvilinear contact surface complimentary to, and slidably abutted by, said contact surface on said one end of said shaft coaxially thereof, and the abutting contact surfaces establishing a direct electric current path between the resilient conductor and the electrode shaft,

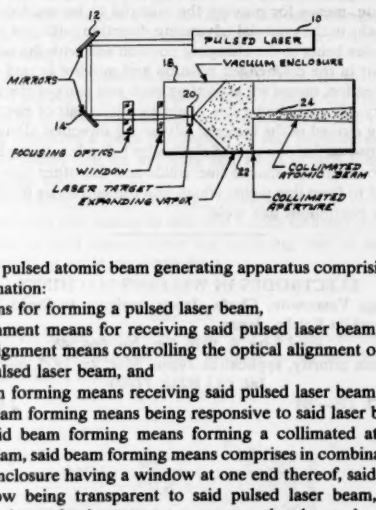
means adjustable at the exterior of said frame to adjust the contact force between the complimentary contact surfaces on said shaft and said member, respectively, and

means supporting the adjacent ends of said shaft and said member around their circumferenes thereby to maintain said member in coaxial alignment with said shaft.

4,091,256
PULSED ATOMIC BEAM APPARATUS

Joseph Fred Friichtenicht, Torrance, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 16, 1975, Ser. No. 541,486
Int. Cl.² H05H *1/04*
U.S. Cl. 219—121 L **3 Claims**



1. A pulsed atomic beam generating apparatus comprising in combination:

means for forming a pulsed laser beam,

alignment means for receiving said pulsed laser beam, said alignment means controlling the optical alignment of said pulsed laser beam, and

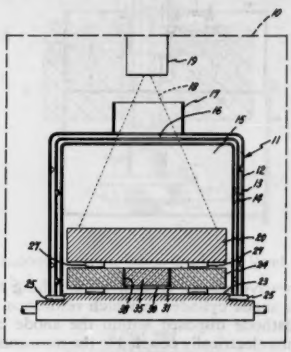
beam forming means receiving said pulsed laser beam, said beam forming means being responsive to said laser beam, said beam forming means forming a collimated atomic beam, said beam forming means comprises in combination:

an enclosure having a window at one end thereof, said window being transparent to said pulsed laser beam, said enclosure having a target, a vacuum chamber and a collimating aperture positioned therein, said target being optically aligned with said window to receive said pulsed laser beam, said vacuum chamber encompassing the area of said target where said laser beam impinges, and a collimating aperture connected to said vacuum chamber, said vacuum chamber having atomic particles therein, said collimating aperture forming said atomic particles into a pulsed atomic beam, said target comprises a transparent substrate with a thin film deposited thereon, said transparent substrate being optically aligned with said window and said pulsed laser beam, said thin film being encompassed by said vacuum chamber, said pulsed laser beam vaporizing said thin film to form a vaporized cloud in said vacuum chamber, said vaporized cloud containing atomic particles.

4,091,257
DEEP DIODE DEVICES AND METHOD AND APPARATUS

Thomas R. Anthony, and Harvey E. Cline, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 552,154, Feb. 24, 1975. This application Nov. 19, 1976, Ser. No. 743,273
Int. Cl.² B23K *15/00*
U.S. Cl. 219—121 EB **9 Claims**

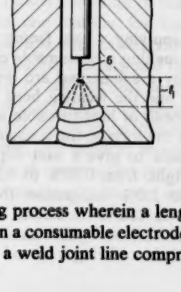


1. Apparatus for the production of deep diode devices which comprises a refractory metal shell providing a chamber, heat sink means in the chamber, a heat source in the chamber comprising a first refractory metal body spaced from the heat sink means, and combination workpiece support and heat shield means positioned between and spaced from the heat sink means and the heat source body, said support and heat shield means comprising a second refractory metal body having an opening to receive a workpiece with upper and lower sides exposed to the first refractory metal body and to the heat sink means and with edge portions enclosed by the annular opening-defining surface of the second refractory metal body, and a plurality of non-metallic refractory material-spacer elements resting on the heat sink means and bearing against the second refractory metal body at spaced intervals around the workpiece-receiving opening therein.

4,091,258
ARC WELDING PROCESS

Motomi Kano, Fujisawa; Keiichiro Hirakoso, Funabashi; Yasuhiro Nagai, Chigasaki, and Toshio Horiuchi, Kamakura, all of Japan, assignors to Kobe Steel, Ltd., Kobe, Japan

Filed Jul. 22, 1976, Ser. No. 707,537
Claims priority, application Japan, Jul. 22, 1975, 50-88880
Int. Cl.² B23K *9/12*
U.S. Cl. 219—125.12 **7 Claims**



1. An arc welding process wherein a length of welding arc is generated between a consumable electrode and the materials to be welded along a weld joint line comprising the steps of:

advancing said electrode in a direction along said weld joint line;

oscillating a welding torch back and forth and parallel to the weld joint line, and

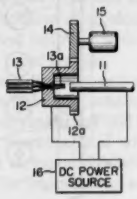
varying the arc length generated by said consumable electrode when the welding torch is at its forward position in said direction of advancement so as to be longer than the arc length when said welding torch is at its rearward position in said direction of advancement.

4,091,259

METHOD FOR WELDING LEAD WIRES TOGETHER

Masaru Tanaka, Toyonaka, and Yoshimitsu Matsumoto, Hyogo, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Jun. 8, 1976, Ser. No. 693,846
Int. Cl.² B23K *9/00*
U.S. Cl. 219—137 R **5 Claims**



1. A process for welding lead wires together, comprising the steps of:

inserting the tip portions of a plurality of lead wires to be welded together into a welding chamber defined by a U-shaped rotatable block of electrically conductive material through a hole in a wall of said block extending between the legs of the U, so that the ends of said tip portions are aligned with each other and adjacent the open portion of said chamber, said wires being in electrical contact with said block at said hole, said tip portions being oriented substantially perpendicular to said wall; positioning a carbon electrode in alignment with said lead wire tip portions, one end of said electrode extending into said welding chamber through the open portion thereof;

rotating said block to twist said lead wire tip portions together and feed said tip portions into said chamber;

applying a DC voltage between said electrode and said block to provide a predetermined arc-producing potential difference between the adjacent ends of said lead wire tip portions and said carbon electrode;

bringing said ends of said lead wire tip portions and said carbon electrode into mutual contact to establish an electric arc therebetween within said welding chamber, the block providing a protection shield from said arc, the heat of said arc melting the ends of said tip portions and welding the same together;

stopping the rotation of said block after said arc is established;

extinguishing said arc; and

removing said welded tip portions from said chamber through said hole in said wall.

4,091,260

STRESS WAVE GENERATING COIL

Basil P. Leftheris, Huntington, and Angelo Varisco, Woodbury, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

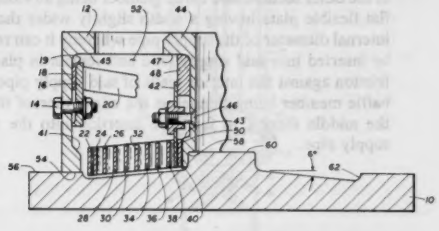
Filed May 2, 1977, Ser. No. 792,706
Int. Cl.² B21J *1/06*
U.S. Cl. 219—149 **9 Claims**

1. In stress wave focusing device a means to generate the stress wave, said means comprising:

an electromagnetic coil having;

an outer case having an electrical source terminal, said outer case being an annular structure to contain forces therewithin;

an inner case having an electrical source terminal, said inner case being a core for the outer case and confine forces therebetween;



a spring coil having a spiral from an outer periphery having attachment to and within said outer case to the coil inner diameter connected with said inner case, such that said coil has an inclined face between said outer case and inner case to provide a concave face therebetween; and;

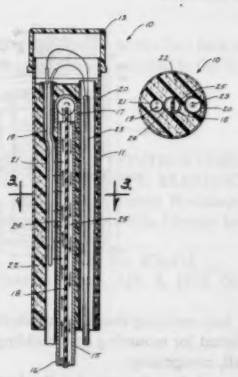
means to insulate adjacent spiralling portions of said coil within said outer case and said inner case.

4,091,261

ELECTRICALLY HEATED ANIMAL WATERING DEVICE

Wayne B. Noland, 340 Cresent Dr., Carlisle, Iowa 50047

Filed Sep. 13, 1976, Ser. No. 722,476
Int. Cl.² F22H *1/12*; A01K *7/06*; F16L *53/00*
U.S. Cl. 219—301 **4 Claims**



1. In an animal watering device of a type having an exterior housing; a water supply pipe disposed in said housing, a heating conduit disposed within said housing adjacent to one side of said water supply pipe; heating means disposed in said heating conduit for heating the water within said pipe; animal watering means connected to said housing and to said water supply pipe for allowing animals to obtain water therefrom, said supply pipe extending from a point below the frost level of the ground to a point adjacent said animal watering means; insulation means within said housing and surrounding said water supply pipe and said conduit; the improvement comprising:

means for causing circulation of water within said water supply pipe including a circuitous passageway disposed within said water supply pipe, circulation means including a baffle member disposed centrally of said supply pipe and

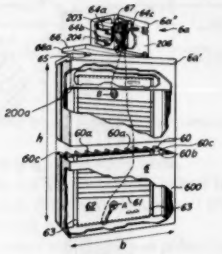
extending from said first point below the frost line to said second point adjacent said animal watering means, said baffle member being vertically disposed and extending along the center line of said water supply pipe thereby dividing the supply pipe into two sections, one of said sections being adjacent to said heating conduit whereby water within said one section becomes heated more than in the other section, said baffle member being an elongated flat flexible plate having a width slightly wider than the internal diameter of the supply pipe whereby it can readily be inserted into said supply pipe and remain in place by friction against the interior walls of said supply pipe, said baffle member being thinner at the edges thereof than in the middle thereof to facilitate insertion into the water supply pipe.

4,091,262

ELECTRICAL ENERGY SUPPLIED HEAT-EMITTING RADIATOR

Verner Andersson, Stationsgatan 1B, 824 00 Hudiksvall, and Hans Jonason, Rubinvagen 29, 952 40 Sundsvall, both of Sweden

Filed Mar. 31, 1976, Ser. No. 672,064
Claims priority, application Sweden, Apr. 2, 1975, 7503759
Int. Cl.[2] F24H *9/08;* F24D *13/02;* H05B *3/02*
U.S. Cl. 219—345 **16 Claims**



1. A heat-emitting radiator supplied with electrical energy and adapted for mounting on a building interior structure such as a wall, comprising:

a channel-shaped contact rail adapted for mounting on a structure and including current conducting means inside said contact rail and means for connecting said current conducting means to a source of electrical power;

a guide rail also adapted for mounting on the structure in spaced apart relationship from said contact rail;

at least one heating cassette supported by said guide rail and said contact rail and including a heat-emitting resistance means fed by current applied to said current conducting-means of said contact rail; and,

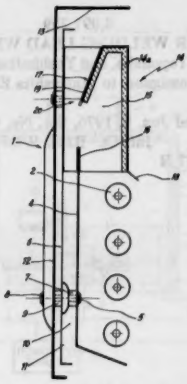
contact means rotatably disposed on each of said at least one cassette electrically connected to said resistance means of said at least one cassette and cooperating with said contact rail and adapted for insertion into the channel of said contact rail in a first deenergized position of rotation and furthe adapted for contacting said current conducting means in a second position of rotation.

4,091,263

PROCESS AND A DEVICE FOR CONTROLLING THE RADIATION-CONVECTION RATIO IN A HEATING APPARATUS

Odette Landeroin-Duvernois, "L'Archerie", Cellettes, 41120 Les Montils, France

Filed Apr. 5, 1976, Ser. No. 674,054
Claims priority, application France, Apr. 14, 1975, 75 11512
Int. Cl.[2] F24H *3/00*
U.S. Cl. 219—377 **6 Claims**



1. In a space heating apparatus comprising at least one heating element, reflector means arranged behind said at least one heating element, so as to radiate heat towards the space to be heated, both directly from said at least one heating element and indirectly from said reflector means, and means for directing towards said space to be heated, hot convection air which has been heated by said at least one heating element; the improvement comprising a box-like member arranged above said at least one heating element, a casing enclosing at least said one heating element and extending above said box-like member, said box-like member comprising a front closed wall, a closed top wall and a rear wall, and being open at its lower end, said rear wall being shorter than said front wall, for intercepting and entrapping the hot convection air heated by contact with said at least one heating element, for providing a cushion of hot air above said at least one heating element, and for permitting escape of said hot air rearwardly, under said shorter rear wall.

4,091,264

HEAT TRANSFER

Domenico S. Sarcia, Carlisle, Mass., assignor to Seal Incorporated, Naugatuck, Conn.

Filed Aug. 13, 1976, Ser. No. 714,009
Int. Cl.[2] B21B *27/06*
U.S. Cl. 219—469 **17 Claims**

1. A heat pipe roller which comprises:

an elongated cylindrical hollow housing closed at its ends defining a heat rejection region;

an elongated shaft extending through said housing, said shaft being attached to and supporting said housing, said shaft defining a heat input region spaced from said heat rejection region;

a volatile working fluid disposed within said housing; and

a wicking structure within said housing extending between said heat input region and said heat rejection region for collecting said working fluid when the latter is in a liquid state and for carrying said liquid state fluid to said heat input region for vaporization as said housing is rotated, said wicking structure comprising a plurality of members in contact with said housing, said members being disposed in groups, said groups being arranged in side-by-side relation along the long axis of said shaft, the members of one group being staggered relative to members of an adjacent group.

10. A heat pipe roller which comprises:

an elongated cylindrical hollow housing closed at its ends defining a heat rejection region;

an elongated shaft extending through said housing, said shaft being attached to and supporting said housing, said shaft including an area which allows for thermal expansion of the shaft intermally of said housing said shaft defining a heat input region spaced from said heat rejection region;

a heater element in the form of an elongate electrical resistance heater mounted centrally within said shaft for supplying heat to said input region;

a volatile working fluid disposed within said housing; and

a wicking structure within said housing and extending between said heat input region and said heat rejection region for collecting said working fluid when the latter is in a liquid state and for carrying said liquid state fluid to said heat input region for vaporization as said housing is rotated.

4,091,265

FUEL FILTER HEATING ASSEMBLY

Mark S. Richards, and Robert Zeff, both of Modesto, Calif., assignors to Racor Industries, Inc., Modesto, Calif.

Filed Aug. 6, 1975, Ser. No. 602,215

Int. Cl.[2] H05B *1/02*; F24H *1/10*; B01D *35/18*; F02M *31/12*

U.S. Cl. 219—501 **5 Claims**

1. A solid state fuel heater unit for use in heating a fuel flow comprising:

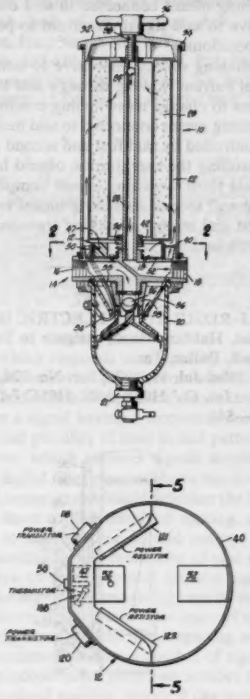
(a) a heat conducting mounting member;

(b) a power transistor mounted on said mounting member in heat conducting relation thereto;

(c) a power resistor mounted on said mounting member in heat exchanging relation thereto and electrically connected in series with said power transistor,

(d) an electrical control circuit, including a thermistor, for controlling the operation of said power transistor, said control circuit being mounted on said mounting member by means of a component sealant isolating said thermistor from direct transfer of heat thereto by said power resistor and said power transistor, and

(e) means for mounting said mounting member in a fuel flow with said power transistor, power resistor and mounting



member in heat exchange relation to the fuel flow and said thermistor in temperature sensing relation to the fuel flow.

4,091,266

ELECTRICAL CIRCUIT FOR CONTROLLING A TEMPERATURE OF A HEATING ELEMENT

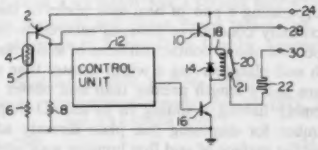
Shinichi Ito; Toshiharu Tanaka, and Noriaki Wakabayashi, all of Kadoma, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 7, 1976, Ser. No. 674,674

Claims priority, application Japan, Apr. 8, 1975, 50/43094; Apr. 8, 1975, 50/43095

Int. Cl.[2] H05B *1/02*

U.S. Cl. 219—504 **12 Claims**



1. An electrical circuit for controlling the temperature of a heating element, which circuit comprises:

a temperature sensing means responsive to ambient temperature, said temperature sensing means having a variable resistance responsive to the sensed temperature;

a resistor connected in series with said temperature sensing means to form a voltage divider therewith;

control means connected to said voltage divider for receiv-

ing a divided voltage generated therein and for generating a signal dependent on said divided voltage;

first switching means connected to said control means and responsive to said signal therefrom to perform "on" and "off" operations;

second switching means responsive to non-existence of an electrical current flowing through said temperature sensing means to change its switching condition; and

third switching means connected to said heating element and being controlled by said first and second switching means for controlling the energization of said heating element,

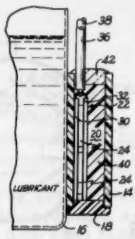
wherein said third switching means comprises a relay, and said first and second switching means respectively comprise first and second switching transistors connected in series with said relay.

4,091,267

SELF-REGULATING ELECTRIC HEATER

John L. Grant, Halifax, Mass., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jul. 19, 1976, Ser. No. 706,368
Int. Cl.² H05B *3/02*; H01C *7/02*
U.S. Cl. 219—544 **4 Claims**



1. A self-regulating heater for heating a fluid sump comprising:

a thermally conductive, electrically insulating tubular housing of a ceramic material having a closed end and an open end and having a D-shaped cross section including a first wall portion with flat inner and outer surfaces and with a second wall portion with inner and outer major circular surfaces and having said first and second wall portions joined by two other wall portions each with inner and outer minor circular surfaces for defining a chamber therein of comparable D-shaped cross-section;

a heater assembly incorporating a heating means constituted by at least one self-heating positive temperature coefficient resistor element having low initial resistance which increases abruptly as its temperature rises above a given level, said element having first and second substantially parallel opposite surfaces each having a layer of electrically conductive material applied thereto forming an ohmic contact surface thereon, said assembly further incorporating a pair of heat sink plates of thermally and electrically conductive material secured in contact with respective ohmic contact surfaces of said resistor element with said plates having a width greater than said heating means and a length greater than said heater means, said assembly having a sliding fit in said D-shaped housing chamber for disposing one plate directly adjacent said inner flat surface of said first housing wall portion and for disposing edges of the second plate adjacent said inner major circular surface of said second housing wall portion for locating the assembly in said chamber;

a thermally conductive electrically insulating ceramic filler cured in situ within the chamber to substantially fill said chamber around said assembly free of entrapped gases for providing excellent heat transfer between the assembly and said housing;

terminal means connected to respective plates and extending from the open housing end for supplying electrical power to said element; and

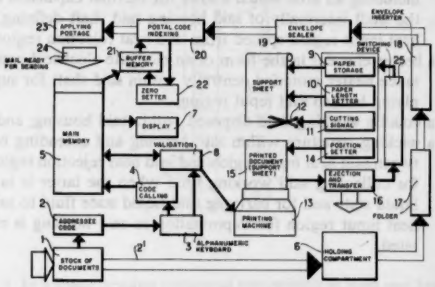
a potting material filling the remainder of the volume of the housing chamber around said terminal means at the open housing end sealing said chamber.

4,091,268

SYSTEM FOR PROCESSING MAIL USING DOCUMENTS OF DIVERSE FORMATS OR TYPES

Paul Jarleton, Fontenay sous Bois, and Marcel Tollet, Paris, both of France, assignors to Societe pour l'Affranchissement et le Timbrage Automatoques S.A., Clichy, France

Filed Apr. 19, 1976, Ser. No. 678,423
Claims priority, application France, Apr. 23, 1975, 75 12637
Int. Cl.² G06K *17/00*; B65B *3/04*
U.S. Cl. 235—424 **4 Claims**



1. In a method for processing mail containing documents which can have various formats and comprises the successive automated steps of:

folding the documents;

putting the documents into envelopes;

sealing the envelopes;

indexing a postal code on the envelopes and applying postage to the envelopes,

the improvement comprising effecting prior to these steps the interrogation of a main memory by an alphanumeric keyboard actuated by an operator, said memory furnishing data which comprises at least the address of an addressee to a printing machine which prints said data on support sheets cut to standard dimensions, combining said support sheets with respective documents such that they are folded therewith, and inserting the folded assembly of a support sheet and a document automatically into a window envelope such that the address of the addressee borne by the support sheet appears in the window of the envelope.

4,091,269

SENSING DEVICE FOR COUNTING WORKPIECES TRANSPORTED IN STEPPED FORMATION

Günther Schick, Am Herrenkamp 10, 4800 Bielefeld, Germany

Filed Feb. 17, 1976, Ser. No. 658,499
Int. Cl.² B31B *1/96*; G06M *7/10*
U.S. Cl. 235—98 B **5 Claims**

1. In an apparatus for counting a stream of articles delivered in an overlapping fashion, the combination comprising:

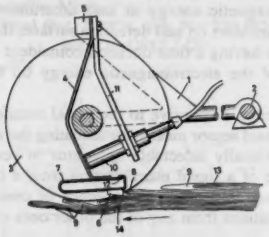
support means;

roller means rotatably mounted on said support means, to be operable to ride on and bear down on the surface of the delivered articles;

a resilient arm means mounted on said support means;

sensing means resiliently supported by said resilient arm means and protruding into the path of said articles for engagement with an edge portion of each of said articles and operable to be moved against the resilient support force of the resilient arm means by said edge portion for a

predetermined distance and then disengaged and returned by the resilient support force of the resilient arm means, to its initial position; and

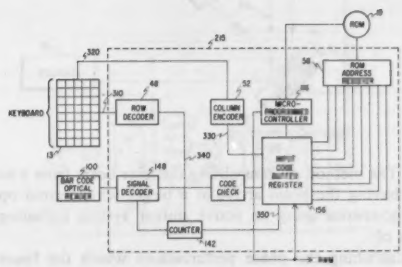


contact means arranged in the path of said resilient arm means and operable to be contacted by said resilient arm means when said sensing means returns to its initial position with respect to the contact means, for counting said articles.

4,091,270
ELECTRONIC CALCULATOR WITH OPTICAL INPUT MEANS

Bernard E. Musch, Palo Alto, and Roy E. Martin, San Jose, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jul. 19, 1976, Ser. No. 706,972
Int. Cl.[2] G06K *15/00, 7/10*
U.S. Cl. 235—419 **18 Claims**



1. A keyless portable electronic calculating apparatus for entering data and at least one command encoded on a record medium and for performing calculations upon the entered data and displaying calculation results, the apparatus comprising:

manually manipulatable keyless input means for entering the data and command in response to manipulation of the input means over the data and command on the record medium, said input means being the sole means for entering data and commands;

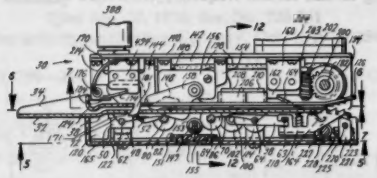
processor means coupled to the input means for executing each entered command and performing a calculation operation upon the entered data in response to entry of said command by the input means, the entered command specifying the operation to be performed; and

display means coupled to the processor means for displaying results of the operation by the processor means in response to entry of said command by the input means.

4,091,271
VALIDATOR FOR SCRIP

Thaddeus M. Jones, South Bend, Ind.; Hasmukh R. Shah, and Charles D. Nash, both of Hot Springs, Ark., assignors to UMC Industries, Inc., New York, N.Y.

Division of Ser. No. 432,42[illegible], Jan. 10, 1974, Pat. No. 3,937,926.
This application Dec. 19, 1975, Ser. No. 642,620
Int. Cl.[2] G06K *13/08*; H01H *47/00*; G06F *7/02*
U.S. Cl. 235—419 **28 Claims**



1. A validator which responds to a plurality of spaced lines in a pattern on a document to help determine the authenticity of said document and which comprises a sensor that scans said pattern to produce a signal having a frequency corresponding to the spacing of said plurality of lines in said pattern, a digital filter, and a counter which receives signals supplied by said digital filter, said digital filter responding to the developing of said signal by said sensor to determine whether the lines of said plurality of lines have a predetermined spacing, said digital filter responding to the first line in said pattern to become actuated and responding to the remainder of said plurality of lines in said pattern to supply to said counter signals corresponding to the number of said remaining lines of said plurality of lines in said pattern if all of said remainder of said lines in said pattern have the same predetermined spacing, said counter requiring a predetermined minimum number of signals, which corresponds to a predetermined minimum number of lines that have said predetermined spacing, before it can provide a predetermined output signal, said digital filter and said counter coacting to indicate that a pattern on said document is authentic if said pattern has a predetermined minimum number of lines that have said predetermined spacing, said digital filter not responding to patterns consisting of lines which do not have said predetermined spacing, and said counter not developing said predetermined output signal when said sensor senses a pattern which consists of an insufficient number of lines having said predetermined spacing, whereby said digital filter and said counter can distinguish between patterns that have said predetermined minimum number of lines with said predetermined spacing and patterns which either do not have a plurality of lines with said predetermined spacing or do not have enough of said lines that have said predetermined spacing.

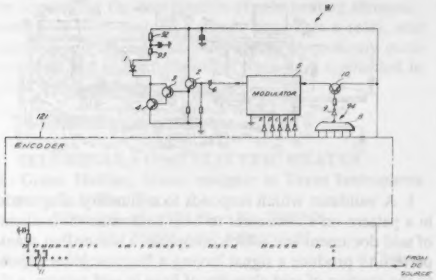
4,091,272
INFRA-RED REMOTE CONTROLLED COMMAND SYSTEM FOR A COMMUNICATIONS RECEIVER

Heinz Richter, Kronach, and Heinz Peetz, Seibelsdorf, both of Germany, assignors to Loewe-Opta GmbH, Kronach, Germany

Filed Jul. 7, 1976, Ser. No. 703,273
Claims priority, application Germany, Jul. 10, 1975, 2530812
Int. Cl.[2] H04B *9/00*
U.S. Cl. 250—199 **14 Claims**

1. In a remote command system for regulating a prescribed function of at least one communication receiver in accordance with one of a plurality of selected manual commands, command sending means including an infra-red transmitting element, resettable command reproduction means disposed at the receiver and including an infra-red detecting element, first frequency controlled oscillator means associated with the command sending means for generating a first pulse sequence at a first rate, first dividing means coupled to the first oscillator

means for generating a second pulse sequence at a second rate corresponding to a sub-multiple of the first rate, first resettable means responsive to the selected manual command signal for encoding the pulse interval of the second pulse sequence to form a third pulse sequence, first means responsive to the output of the first encoding means for modulating the first pulse sequence to form a fourth pulse sequence, means for applying the fourth pulse sequence to the transmitting element for radiation to the detecting element of the command reproducing means, second frequency controlled oscillator means



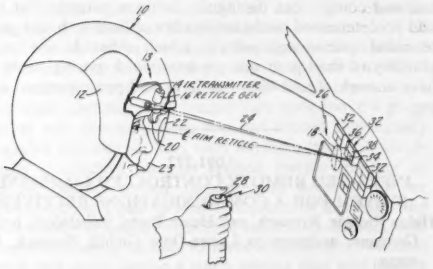
associated with the reproducing means for generating a fifth pulse sequence identical to the first pulse sequence at the first rate, second dividing means coupled to the second oscillator means and normally responsive to the detected fourth pulse sequence for generating a sixth pulse sequence identical to the second pulse sequence at the second rate upon the detection of the first pulse of the fourth pulse sequence, and means including checking means responsive to the detected fourth pulse sequence for encoding the repetition interval of the sixth pulse sequence to yield a seventh pulse sequence decodable to reproduce the selected command.

4,091,273

ELECTRO-OPTICAL SWITCHING SYSTEM

William Brewster Fuller, Stamford; Edwin F. Potter, Jr., and Melvin Arnold Marcus, both of Westport, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 17, 1976, Ser. No. 751,559
Int. Cl.[2] H04B 9/00
U.S. Cl. 250—199 **8 Claims**



1. Electro-optical switching system for providing visual selection and remote actuation of visually selectable electronic apparatus, comprising:

activating source means, adapted for disposal on the anatomy of an operator, and including transmitter means for providing a beam of electromagnetic energy at a determined carrier frequency within the optical frequency spectrum, said beam being transmitted along an axis of propagation in a spatial direction determined by the operator;

visually activated switch means, one for each of an associated one of the visually selectable apparatus, each disposed at a determined visual distance within the field of view of the operator, and each including electromagnetic radiation sensor means having a radiation detection surface for providing a signal manifestation in response to electromagnetic energy at said determined carrier frequency incidnet on said detection surface, the signal manifestation having a time duration coincident with the incidence of the electromagnetic energy on said detection surface;

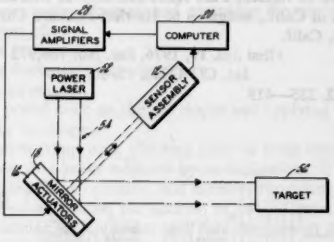
control means, responsive to the signal manifestations from each of said sensor means, for actuating the associated one of the visually selectable apparatus in response to the presence of a signal manifestation from a corresponding one of said sensors in the absence of concurrent signal manifestations from any of the other ones of said sensors.

4,091,274

ACTIVE LASER MIRROR SYSTEM

Albert Wolcott Angelbeck, Glastonbury, Conn.; Edward Wayne Vinje, Nashua, N.H.; George Robert Wisner, Deep River, Conn.; Ronald Harold Freeman, Delray Beach, Fla.; Harold C. Reynolds, Jr., Palm Beach Gardens, Fla., and Donald Lee Witt, North Palm Beach, Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 22, 1976, Ser. No. 753,337
Int. Cl.[2] G01J 1/20
U.S. Cl. 250—201 **1 Claim**



1. The method of transmitting the laser beam from a source and having the beam arrive at a target with desired optical characteristics using an active mirror system including the steps of:

establishing the phase perturbations which the beam has upon arrival at the target under a given set of conditions;

determining the corrective contour of a reflective surface which would produce offsetting phase effects to the beam;

arranging a mirror assembly having a deformable reflective surface in the optical path of the beam;

setting the actual contour of the surface to conform with the contour which provides the offsetting phase effects to the beam;

transmitting the beam from the source to the target by reflection off the deformable surface;

monitoring the contour of the surface of the deformable mirror with an auxiliary laser during actual transmission of the beam;

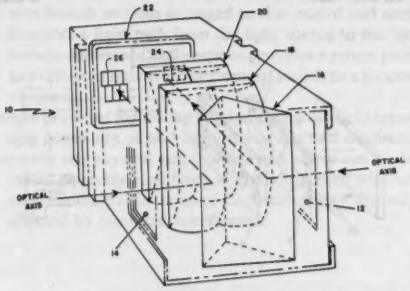
comparing continuously on a real time basis the actual contour of the surface with the corrective contour initially determined; and

adjusting the actual contour to more closely match the initially determined contour.

4,091,275
AUTOMATIC FOCUS SYSTEM WITH OSCILLATION INHIBIT CIRCUIT

Dennis J. Wilwerding, Littleton, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 7, 1976, Ser. No. 730,552
Int. Cl.[2] G01J 1/20
U.S. Cl. 250—201 5 Claims



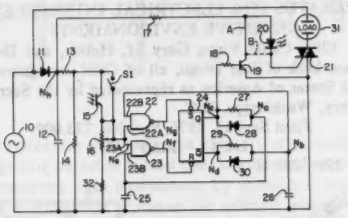
1. In a continuous focus system having focus control means for providing focus correction signals, and positioning means for positioning optical means in response to the focus correction signals, the improvement comprising:

inhibit means for inhibiting the positioning means unless each focus correction signal within a predetermined time requires position correction in the same direction.

4,091,276
REMOTE CONTROL SWITCHING

Victor Lebovici, 29 Farmington Rd., West Newton, Mass. 02165

Continuation of Ser. No. 640,532, Dec. 15, 1975, abandoned.
This application Jan. 3, 1977, Ser. No. 756,145
Int. Cl.[2] H01J 39/12, 31/50
U.S. Cl. 250—214 R 6 Claims



1. An electrical control system comprising means defining a load, an A.C. outlet connected to a source of A.C. power, bi-directional thyristor switching means, in series betwen the load and outlet and further comprising a control for said thyristor comprising,

a flip-flop having one output coupled to said thyristor swtiching device for maintaining said thyristor conductive and nonconductive when in first and second respectively of its two stable states,

a single photoelectric transducing device,

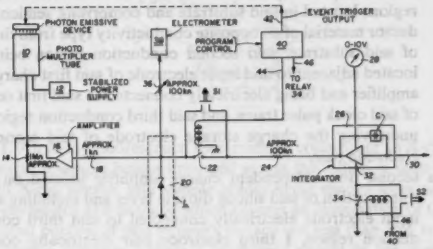
first and second NAND gate means for coupling said photoelectric transducing device to said flip-flop to shift the flip-flop from one of its stable states to the other when the signal provided by said photoelectric transducer exceeds a predetermined threshold level so that successive exposures of the photoelectric transducing device to light exceeding the level will change the conductive or nonconductive state of the thyristor,

and delay means responsive to the occurrence of a change in the stable state of said flip-flop for preventing a subsequent change in the stable state of said flip-flop until a number of seconds have elapsed.

4,091,277
PHOTON DETECTION AND COUNTING SYSTEM

Karl Doblhofer, Berlin, Germany, assignor to Max-Planck-Gesellschaft zur Forderung der Wissenschaftern e.v., Gottingen, Germany

Filed Sep. 22, 1976, Ser. No. 725,561
Claims priority, application Germany, Oct. 1, 1975, 2543863
Int. Cl.[2] H01J 39/12
U.S. Cl. 250—214 R 9 Claims



1. Photon detection and counting system comprising a photon multiplier tube (PMT) (10);

an evaluation circuit means 26, 28, 30) including a summing integrator (26), and controlled reset switch means (34) connected to the integrator (26) and resetting the integration by the integrator when the switch means is controlled to be closed to start a new summing cycle;

and a coupling circuit connecting the output of the photo multiplier tube (10) to the evaluation circuit (26, 28, 30) and providing standardized pulses thereto representative of photons sensed by the photo multiplier tube, including

an amplifier (16), a limiter (L) connected to the amplifier (16) to limit the output signals from the amplifier being applied to the evaluation circuit (26, 28, 30), and controlled switch means (22) connecting the output of the limiter (L) to the evaluation circuit (26, 28, 30).

4,091,278
TIME-INDEPENDENT CIRCUIT FOR MULTIPLYING AND ADDING CHARGE

Wallace Edward Tchon, Phoenix, Ariz., assignor to Honeywell Information Systems Inc., Phoenix, Ariz.

Filed Aug. 18, 1976, Ser. No. 715,270
Int. Cl.[2] G11C 19/28; H01L 29/78
U.S. Cl. 307—221 D 3 Claims

1. A time-independent charge transfer circuit for amplifying and accumulating charge comprising

a substrate of a given type of semiconductor material,

a layer of silicon dioxide overlying one surface of said substrate,

a plurality of first electrode pairs located on a first portion of said silicon dioxide layer, each of said first electrode pairs comprising a charge transfer electrode and a charge storage electrode, said electrodes of each pair being electrically connected,

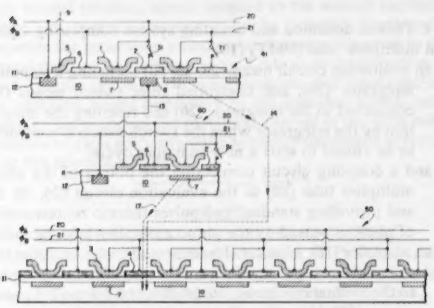
a plurality of clock driver circuits for generating a plurality of different clock pulse trains, a first one of said clock pulse trains being applied to alternate ones of said first electrode pairs during any given clock cycle, and a second one of said clock pulse trains being applied to the remaining ones of said first electrode pairs during any given clock cycle,

a first conduction region is said substrate underlying the

charge storage electrode of one of said first electrode pairs, said first conduction region comprising semiconductor material of an opposite conductivity type from that of said substrate,

a first time-independent charge amplifier located on a second portion of said silicon dioxide layer and including an input electrode electrically connected to said first conduction region, a second electrode pair electrically connected to said first one of said clock pulse trains, said second electrode pair comprising a charge transfer electrode and a charge storage electrode, said electrodes being electrically connected, a charge storage region located in said substrate beneath said charge storage electrode of said second electrode pair, and second and third conduction regions located in said substrate and comprising semiconductor material of an opposite conductivity type from that of said substrate, said second conduction region being located adjacent to said input electrode of said first charge amplifier and being electrically connected to said first one of said clock pulse trains, and said third conduction region underlying the charge storage electrode of said second electrode pair,

a second time-independent charge amplifier located on a third portion of said silicon dioxide layer and including an input electrode electrically connected to said third conduction region, a third electrode pair electrically con-



nected to said second one of said clock pulse trains, said third electrode pair comprising a charge transfer electrode and a charge storage electrode, said electrodes being electrically connected, a charge storage region located in said substrate beneath said charge storage electrode of said third electrode pair, and a fourth conduction region located in said substrate and comprising semiconductor material of an opposite conductivity type from that of said substrate, said fourth conduction region being located adjacent to said input electrode of said second charge amplifier and being electrically connected to said second one of said clock pulse trains,

a charge accumulator circuit located on a fourth portion of said silicon dioxide layer and including a plurality of fourth electrode pairs, each of said fourth electrode pairs comprising a charge transfer electrode and a charge storage electrode, said electrodes of each pair being electrically connected, alternate ones of said fourth electrode pairs being electrically connected to said first one of said clock pulse trains and the remaining ones of said fourth electrode pairs being electrically connected to said second one of said clock pulse trains, and a charge storage region located in said substrate beneath each of said charge storage electrodes of said charge accumulator circuit, and

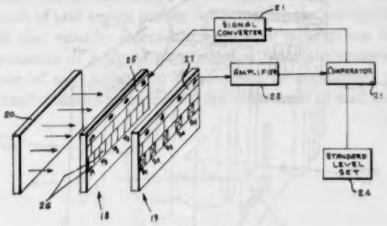
means for electrically connecting said charge storage region of said second charge amplifier with one of said charge storage regions of said charge accumulator circuit.

4,091,279

METHOD AND MEANS FOR EQUALIZING THE SENSITIVITY OF A MULTI-ELEMENT SENSOR ARRAY

Irving Kaufman, Tempe, Ariz., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 23, 1976, Ser. No. 669,543
Int. Cl.[2] G02F *1/01*; H01J *39/12*
U.S. Cl. 250—225 **4 Claims**



4. A sensor array having individual sensor element sensitivity setting means comprising

an array of sensor elements,

a sheet member of transparent fine grained ferroelectric ceramic material having long term polarization retention capabilities positioned adjacent to and in light intercepting relationship with the light receiving surfaces of said sensor element,

a light filtering means positioned adjacent to and in light interception relationship with said sheet members,

a light polorizer means positioned between said sheet member and said sensor element, and

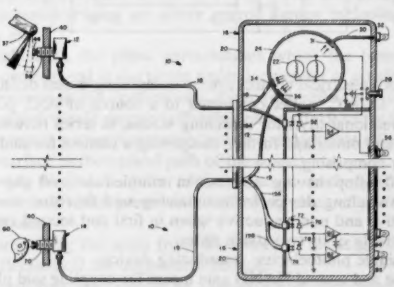
means for selectivity fixing the polarity characteristics of a discrete portion of said sheet member adjacent to each sensor element.

4,091,280

FIBER OPTIC POSITION SENSING AND INDICATING APPARATUS FOR ELECTRICAL INTERFERENCE SENSITIVE ENVIRONMENTS

John R. Ellis, Chula Vista; Gary M. Holma, and Donald B. Forman, both of San Diego, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 13, 1976, Ser. No. 723,009
Int. Cl.[2] G01D *5/34*
U.S. Cl. 250—231 R **2 Claims**



1. Apparatus for passively sensing the physical condition of a remotely located object in an electrical interference sensitive environment comprising:

an optical switch including a pressure sensitive member mechanically operable by said object alternately according to different positions of said object;

said pressure sensitive member being provided with a pair of

spaced reflective surfaces, each surface having a different degree of reflectivity;

a light source;

a single optical simultaneous light transmitting and receiving conductor having one end capable of receiving light from said light source for transmission through the other end to illuminate said optical switch;

said optical conductor having a portion divided into at least two branch sections arranged so that one of said sections provides a light path from the light source to the optical switch, and one of said sections provides a return path for any reflected light from said optical switch to a processing means;

means provided for testing and indicating the light transmitting continuity of said light source and said conductor;

whereby the physical condition of said object can be determined passively at all times at a remote station without the need for the transmission of electrical energy that may be affected by electrical interference.

4,091,281

LIGHT MODULATION SYSTEM

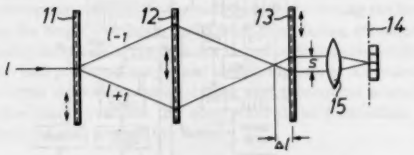
Jorg Willhelm, Nauborn, and Dietmar Kaul, Solms, both of Germany, assignors to Ernst Leitz GmbH, Wetzlar, Germany

Filed Jun. 23, 1975, Ser. No. 589,563

Claims priority, application Germany, Jul. 1, 1974, 2431551

Int. Cl.[2] H01J *39/12*

U.S. Cl. 250—237 G **5 Claims**



1. In a system for measuring the property of movement of a light dispersing object in at least one coordinate direction, said object generating light modulations by utilizing at least three consecutive diffraction processes for splitting a beam of light into at least two diffraction orders and for condensing the latter ones;

photoelectric detector means producing from said light modulated electrical signals shifted in phase and evaluating means producing from said signals an output signal indicative of the property of movement, the improvement comprising:

(a) a light source having an optical axis and generating light beams from a given point on said optical axis;

(b) at least two diffraction gratings spaced along said optical axis for causing said at least three consecutive diffraction processes, at least one of said gratings defining said light dispersing object and another one of said gratings being spaced for modulating said light beams and condensing them by diffraction into at least two points for further diffraction; and

(c) optical means concentrating said further diffracted light beams onto said photoelectric detector means for causing the latter one to generate electric rotational field signals indicative of said property of movement.

4,091,282

X-RAY FLUORESCENCE SPECTROMETER

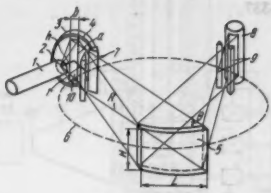
Kliment Vladislavovich Anisovich, prospekt Maxima Gorkogo 67, kv. 16, and Nikolai Ivanovich Komyak, Kostromskoi prospekt, 22, kv. 71, both of, Leningrad, U.S.S.R.

Filed Sep. 17, 1976, Ser. No. 724,231

Claims priority, application U.S.S.R., Sep. 26, 1975, 2174672

Int. Cl.[2] G21K *1/06*

U.S. Cl. 250—280 **3 Claims**



1. An X-ray fluorescence spectrometer comprising an X-ray source; a sample holder arranged across the radiation path of said X-ray source, said sample holder being spaced from said X-ray source at a distance which ensures an illumination of the central portion of said sample's surface not less than 15Z erg/s·cm^2·w, wherein Z defines an atomic weight of the X-ray anode, at a voltage of 50 kV across said source; an analyzing crystal which focuses the fluorescent radiation of said sample placed in said sample holder; the curve of the planes of said analyzing crystal defining a focal circle, said sample holder being so arranged with respect to said focal circle that the distance between the latter and the surface exposed to radiation of said sample placed in said sample holder is not in excess of the product of the distance between the focus of said source and said surface exposed to radiation of said sample by the ratio between the diameter of said focal circle and the length of said analyzing crystal; and a detector which records radiation reflected from said analyzing crystal.

4,091,283

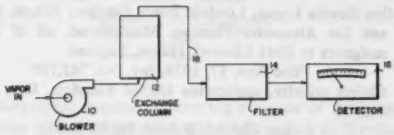
EXTREMELY SENSITIVE METALLIC VAPOR DETECTION

Kuan-Han Sun, Pittsburgh, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 2, 1975, Ser. No. 592,855

Int. Cl.[2] G01T *1/161*

U.S. Cl. 250—303 **10 Claims**



1. A method of detecting the presence of a metallic vapor comprising a metal selected from the group consisting essentially of Sodium, Potassium, and mixtures thereof, in the containment atmosphere of a nuclear reactor, said method comprising:

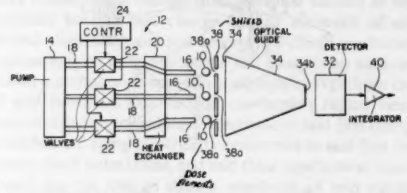
(a) passing a stream of said containment atmosphere through an exchange column, said exchange column which releases tritium when in contact with said metallic vapor comprising at least one chemical compound selected from the group consisting of XT, wherein T is tritium and X is selected from the group consisting of —OH, —OT, RCOO—, and RO—, and mixtures thereof, wherein R is $-C_nH_{2n+1}$ and where n varies from about 1 to 20; and

(b) then passing said stream through an ionization chamber which can detect tritium.

4,091,284
THERMOLUMINESCENT DOSIMETER READOUT INSTRUMENT

Terumasa Yamamoto; Katsuhiko Miyagawa; Hidenori Kunishige, and Fusafumi Nakao, all of Kadoma, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Sep. 23, 1976, Ser. No. 725,711
Claims priority, application Japan, Oct. 1, 1975, 50-119211
Int. Cl.² G01T 1/11
U.S. Cl. 250—337 **8 Claims**



1. A readout instrument for radiation dosimeters of the thermoluminescence type, comprising:

support means for stationarily keeping one or a plurality of the dosimeter elements in preset positions;

heating means for selectively and individually heating said dosimeter elements to a predetermined temperature;

a photoelectric transducer arranged to receive thermoluminescence emitted from each of said dosimeter elements;

a thermal radiation shield plate interposed between said dosimeter elements and said photoelectric transducer to confront all of said dosimeter elements, said shield plate having at least one slit shaped and arranged to individually confront a corresponding one of said dosimeter elements, each said one slit being smaller than a corresponding dosimeter both in width and in height so that the thermoluminescence emitted from each of said dosimeter elements is transmitted to said photoelectric transducer only through the confronting slit; and

an optical guide member interposed between said shield plate and said photoelectric transducer and shaped to condense the thermoluminescence transmitted through each of said at least one slit onto said photoelectric transducer.

4,091,285
TRAVERSE AND ROTATE CT SCANNER HAVING ROTATIONAL STEP THROUGH A MULTIPLE OF THE FAN ANGLE

Allan Beattie Logan, London; Robin Geoffrey Marsh, Reading, and Ian Alexander Fleming, Maidenhead, all of England, assignors to EMI Limited, Hayes, England

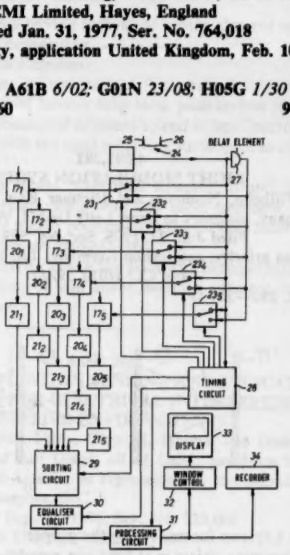
Filed Nov. 17, 1976, Ser. No. 742,709
Claims priority, application United Kingdom, Dec. 2, 1975, 49349/75
Int. Cl.² A61B 6/02; H05G 1/30
U.S. Cl. 250—360 **5 Claims**

1. An apparatus for examining a slice of a body by means of penetrating radiation including a source of a substantially planar fan shaped spread of radiation arranged to irradiate the slice, a plurality of detectors co-operating with respective collimators to determine the intensity of the radiation transmitted along a plurality of beams within said fan shaped spread, means for scanning the source and detectors to scan the said fan shaped spread laterally in the said slice to provide determinations of the intensity of radiation transmitted along a plurality of sets of substantially parallel paths, each set provided by one of said detectors in the course of the lateral scan and means for orbiting said source and detectors between successive lateral scans about a common axis intersecting the said slice wherein the angle of the said orbital step is greater than the angle subtended by the said fan shaped spread by an integral multiple thereof and gaps in the information left thereby during the first 180° of orbital motion are filled, at least in part, in the course of the subsequent orbital motion.

4,091,286
RADIOGRAPHY APPARATUS WHEREIN INTERLEAVING OF BEAM PATHS IS EFFECTED BY CHANGING THE PHASE OF THE TIMING PULSES

Allan Beattie Logan, London; Robin Geoffrey Marsh, Reading, and Ian Alexander Fleming, Maidenhead, all of England, assignors to EMI Limited, Hayes, England

Filed Jan. 31, 1977, Ser. No. 764,018
Claims priority, application United Kingdom, Feb. 10, 1976, 5138/76
Int. Cl.² A61B 6/02; G01N 23/08; H05G 1/30
U.S. Cl. 250—360 **9 Claims**

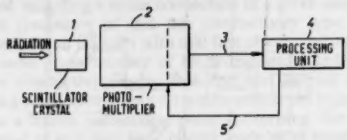


1. Radiographic apparatus comprising a source of a substantially planar spread of penetrating radiation, means for supporting said source to project said radiation across an opening in which a body to be examined can be inserted, the spread of radiation being disposed to irradiate a selected cross-sectional slice of said body, means for angularly moving said means for supporting, and with it said source, about an axis intersecting said slice, a plurality of detector devices disposed to receive radiation directed through said slice along a plurality of groups of divergent beam paths, in said slice, during said angular movement, a signal channel for each detector device arranged to receive output signals, developed by said detector devices and indicative of the absorption suffered by said radiation on traversing said beam paths, and means for generating timing signals for application to said channels to distinguish the output signals relating to each of said groups, said timing signals being related to the angular movement of said means for supporting relative to said body, and means, effective during said angular movement for changing the relationship between said timing signals and said angular movement, so as to derive output signals relating to more of said groups of beam paths than would have been available without said change of relationship.

4,091,287
SCANNING RADIOLOGY WITH INITIAL SCAN FOR ADJUSTING SYSTEM SO THAT DETECTOR MEANS OPERATES WITHIN ITS PREFERRED RANGE

Godfrey Newbold Hounsfield, Newark, England, assignor to EMI Limited, Hayes, England

Division of Ser. No. 572,740, Apr. 29, 1975, Pat. No. 3,956,633.
This application Jan. 28, 1976, Ser. No. 653,114
Claims priority, application United Kingdom, May 8, 1974, 20259/74
The portion of the term of this patent subsequent to May 11, 1993, has been disclaimed.
Int. Cl.[2] A61B 6/02; G01N 23/08
U.S. Cl. 250—362 5 Claims



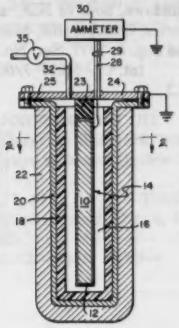
1. Radiological apparatus including a radiation source for projecting radiation through a body, detector means for detecting radiation transmitted from said source at least one beam path through the body and for producing a respective output signal for each such beam path, said detector means having a predetermined, preferred range of operation, scanning means for scanning said source and said detector means relative to the body to cause said detector means to produce a plurality of output signals relating to sets of co-planar beam paths at different angles, each set including beam paths distributed over a substantial area of the body in the plane of said paths, and calibrating means for deriving, during an initial scanning movement, calibration signals relating to a calibrating set of beam paths distributed across said substantial area and for adjusting the relationship between the calibration signals and the absorption suffered by the radiation on traversing the body along the respective beam paths such that, during subsequent scanning movements, the detector means operates substantially within said preferred range, and evaluating means for utilising the output signals produced during said subsequent scanning movements to evaluate the absorption of said radiation by elements of said area of the body.

4,091,288
THRESHOLD SELF-POWERED GAMMA DETECTOR FOR USE AS A MONITOR OF POWER IN A NUCLEAR REACTOR

Francis E. LeVert, Chicago, and Samson A. Cox, Darien, both of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 4, 1977, Ser. No. 784,402
Int. Cl.[2] G01T 1/22
U.S. Cl. 250—370 6 Claims

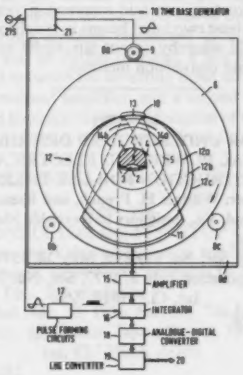
1. A detector of the power level in a nuclear reactor by measuring high-energy gamma rays, the detector comprising:
means for screening out low-energy gamma rays;
means for generating Compton and photoelectrons in response to high-energy gamma rays;
means for screening out low-energy Compton and photoelectrons produced in an emitter;
means for screening out low-energy photoelectrons produced by back-scattered gamma rays;
means for detecting Compton and photoelectrons produced by the high-energy gamma rays; and
means for measuring current of the Compton and photoelectrons produced by high-energy gamma rays, which current is a measure of the flux of high-energy gamma rays and hence of the power level of the reactor.



4,091,289
RADIOGRAPHY

Christopher Archibald Gordon LeMay, Osterley, England, assignor to EMI Limited, Hayes, England

Filed Jan. 26, 1977, Ser. No. 762,521
Claims priority, application United Kingdom, Feb. 3, 1976, 4134/76
Int. Cl.[2] G03B 41/16
U.S. Cl. 250—445 T 10 Claims



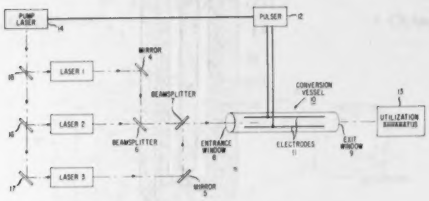
1. Radiographic apparatus including a source of a substantially planar spread of penetrating radiation, such as X-radiation, detector means responsive to said radiation for detecting the radiation after it has passed through a body under examination, scanning means for scanning at least said source around the body about an axis intersecting said spread of radiation, means for causing relative movement to occur between said spread of radiation and said detector means, and collimator means including a plurality of apertured members, each including a respective part disposed between said body and the detector means, said parts being disposed so that they are successively encountered by said radiation, and means for moving said members at respective, different rates across said spread of radiation, said rates being influenced by the rate at which said scanning is executed, the rate of said relative movement and the proximity of the respective part to said detector means, whereby said apertured members as a whole act as a dynamic collimator arrangement for said detectors.

4,091,290

STARK TUNING OF FOUR-WAVE MIXING PROCESSES

Gary Carl Bjorklund, West Windsor, and Richard Reiling Freeman, Middletown, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sep. 8, 1977, Ser. No. 831,529
Int. Cl.[2] H03F 7/00
U.S. Cl. 307—88.3 7 Claims



1. A tunable source of ultraviolet radiation comprising:

a conversion vessel having an entrance window transparent to visible radiation and an exit window transparent to ultraviolet radiation located along an axis, containing a conversion medium the atoms of which have at least two electrons in the outermost shell, which conversion medium has a spectrum of autoionizing states,

means for applying an electric field to said conversion medium so that said spectrum of autoionizing states is altered by the Stark effect,

means for generating at least two synchronized input beams of coherent optical radiation the frequencies of which at least two input beams combine to an output frequency close to the frequency of an autoionizing state of said conversion medium, and

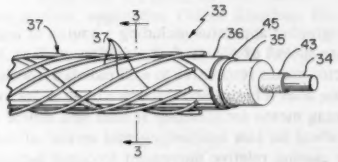
means for directing into said conversion vessel along said axis said at least two input beams in synchronism with said electric field whereby output ultraviolet radiation is generated in said conversion medium.

4,091,291

SYSTEM FOR UNDERGROUND DISTRIBUTION OF ELECTRICAL POWER AND ELECTRICAL CABLE CONSTRUCTION FOR USE THEREIN

Walter W. Foster; William H. French, and Ramon I. Lindberg, all of Richmond, Va., assignors to Reynolds Metals Company, Richmond, Va.

Continuation of Ser. No. 579,895, May 22, 1975, abandoned.
This application Feb. 3, 1977, Ser. No. 765,122
Int. Cl.[2] H01B 7/28
U.S. Cl. 307—95 21 Claims



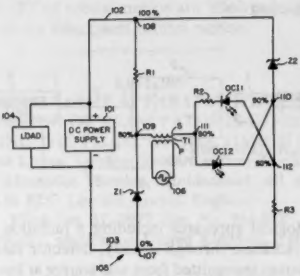
1. An underground AC electrical power cable construction having an uncovered neutral conductor and an integral sacrificial anode protecting the neutral conductor, said cable construction also comprising a central conductor and tubular insulator means for said central conductor, said sacrificial anode being supported by said insulator means and extending along substantially the full length thereof, said neutral conductor being supported by said insulator means concentrically therearound and engaging said sacrificial anode at a plurality of points therealong, said sacrificial anode protecting said neutral conductor underground against soil and galvanic corrosion as well as reducing AC corrosion of said neutral conductor by providing additional surface area for the dissipation of currents leaving the neutral conductor.

4,091,292

FAIL-SAFE MONITOR OF D.C. VOLTAGE

Henry C. Sibley, Fairport, N.Y., assignor to General Signal Corporation, Rochester, N.Y.

Filed Mar. 7, 1977, Ser. No. 775,008
Int. Cl.[2] H02H 3/20, 3/24
U.S. Cl. 307—130 14 Claims



1. A bridge circuit bridged between first and second reference points for responding to a potential difference between said first and second reference points and comprising in combination:

(a) a source of a.c. signals having first and second terminals with said first terminal coupled to said first reference point; and

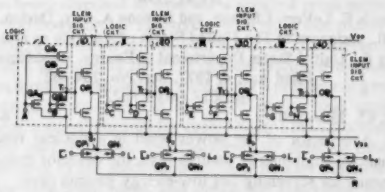
(b) first and second polarity responsive devices coupled in parallel and in opposite senses between said second reference point and said second terminal of said a.c. signal source for forward biasing one of said polarity responsive devices and reverse biasing the other of said polarity responsive devices in response to any difference of potential and polarity between said second terminal and said second reference point.

4,091,293

MAJORITY DECISION LOGIC CIRCUIT

Hisashige Ando, Kawasaki, Japan, assignor to Fujitsu Limited, Kawaskai, Japan

Filed Dec. 15, 1976, Ser. No. 750,884
Claims priority, application Japan, Dec. 30, 1975, 50-158123; Dec. 30, 1975, 50-158124
Int. Cl.[2] H03K 19/08, 19/42
U.S. Cl. 307—205 13 Claims



1. A majority decision logic circuit for deciding the majority of a selected number of logic conditions, comprising:

a plurality of elementary input signal circuits, each elementary input signal circuit having an input and an output and comprising one MOS transistor of one conductivity type and another MOS transistor of another conductivity type, one electrode of each of said one and said another MOS

transistors being connected together to form a first connection point comprising the output terminal of said each elementary input signal circuit, said one and said another MOS transistors each having a corresponding gate electrode interconnected to form a second connection point comprising the input terminal of said each elementary input signal circuit, said one and said another MOS transistors having further electrodes connected to a power source so as to connect all the elementary input signal circuits in parallel thereto, the output terminals of all the elementary input signal circuits being connected together to form a third connection point comprising an output of the majority decision circuit;

a plurality of logic circuits, one for each corresponding elementary input signal circuit, connected in parallel to said power source, each logic circuit comprising a first circuit including a series connection of a given number of MOS transistors of said one conductivity type, and a second circuit in series with said first circuit and including the same given number of MOS transistors and of said other conductivity type, said first and second circuits having respective output terminals connected together to form a fourth connection point comprising the output terminal of said each logic circuit, each MOS transistor of said first circuit having a gate electrode connected to a gate electrode of a corresponding MOS transistor of said second circuit to form a fifth connection point comprising an input terminal of said each logic circuit, the plurality of input terminals of said plurality of logic circuits comprising the input of said majority decision circuit;

connecting means, one for each logic circuit, for connecting each respective output terminal of said each logic circuit to the input terminal of said corresponding elementary input signal circuit; and

switching circuit means, one for each elementary input signal circuit, and connected for selectively activating only an odd number of said output terminals of said elementary input signal circuits.

4,091,294

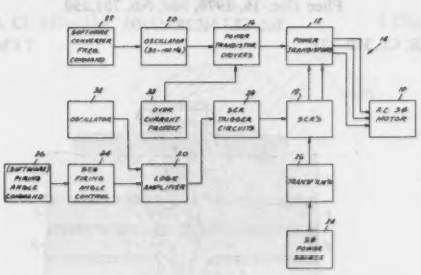
A.C. MOTOR CONTROL APPARATUS AND METHOD

Frank Zankl, Milwaukee; Edward E. Kirkham, Brookfield; Richard E. Stobbe, Greenfield, all of Wis., and John J. Schachte, West Hartford, Conn., assignors to Kearney & Trecker Corporation, West Allis, Wis.

Continuation of Ser. No. 551,029, Feb. 19, 1975, Pat. No. 3,986,087, which is a continuation of Ser. No. 285,813, Sep. 1, 1972, Pat. No. 3,878,445. This application Jul. 19, 1976, Ser. No. 706,581

Int. Cl.[2] H02P *5/40*

U.S. Cl. 318—227 **8 Claims**



1. A servo system for controlling an a.c. motor to drive a movable member in accordance with a specified program that designates the velocity and distance of movement of the movable member including, means for supplying a.c. power to said motor, a transducer connected to be actuated with the movement of said movable member to indicate the distance of movement of said movable member, a register for recording the output of said transducer, reading means arranged to periodically read the data in said register at equal intervals of time, means for producing a control signal in response to the data read by said reading means, and means responsive to said control signal for regulating the flow of said a.c. power to produce the specified program of operations of said movable member.

4,091,295

TRANSISTOR CIRCUIT

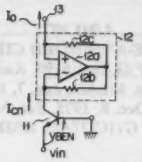
Hisashi Yamada, and Masayuki Katakura, both of Kawasaki, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Oct. 7, 1976, Ser. No. 730,629

Claims priority, application Japan, Oct. 8, 1975, 50-120791; Oct. 17, 1975, 50-124440

Int. Cl.[2] H03K *17/00*

U.S. Cl. 307—229 **6 Claims**



1. A transistor circuit including an equivalent PNP transistor circuit comprising at least one NPN transistor and a current inverting amplifier connected to a collector of the NPN transistor for inverting a collector current of the NPN transistor and including an operational amplifier having an inverting input terminal connected to the collector of the NPN transistor, a noninverting terminal connected to a predetermined potential point and an output terminal, a first impedance element connected between the inverting input and output terminals of the operational amplifier, and a second inpedance element connected between the output terminal of the operational amplifier and a point having a potential equal to the predetermined point.

4,091,296

SEMICONDUCTOR R-S FLIP-FLOP CIRCUIT

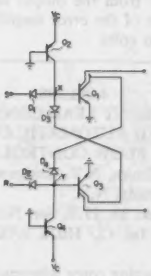
Yasoji Suzuki, Ayase; Yukuya Tokumaru, and Masanori Nakai, both of Yokohama, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Tokyo, Japan

Filed Nov. 30, 1976, Ser. No. 746,169

Claims priority, application Japan, Dec. 1, 1975, 50-142179

Int. Cl.[2] H03K *3/286*

U.S. Cl. 307—292 **2 Claims**



1. A semiconductor R-S flip-flop circuit comprising first and second input terminals; first and second output terminals; a first diode means having a cathode connected to the first input

terminal and adapted to be rendered nonconductive when a "1" level signal is inputted to the first input terminal; a first switching transistor having a base connected to the anode of the first diode means and a first collector connected to the first output terminal; a first injector transistor constituting together with the first switching transistor an integrated injection logic unit; a second diode means having an anode connected to the base of the first switching transistor; a third diode means having a cathode connected to the second input terminal and adapted to be rendered nonconductive when a "1" level signal is inputted to the second input terminal; a fourth diode means having a cathode connected to a second collector of the first switching transistor; a second switching transistor having a base connected to the anode of the third and fourth diode means, a first collector connected to the second output terminal and a second collector connected to the cathode of the second diode means; and a second injector transistor constituting together with the second switching transistor an integrated injection logic circuit.

4,091,297

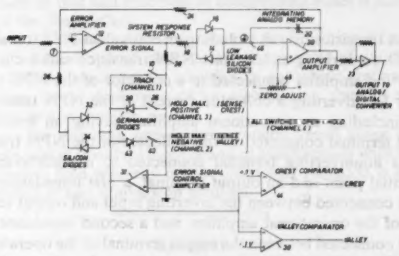
SAMPLE-AND-HOLD CIRCUIT

Thomas W. Stephens, P.O. Box 6190, Austin, Tex. 76762

Continuation of Ser. No. 431,421, Jan. 7, 1974, abandoned. This application Dec. 8, 1975, Ser. No. 638,262

Int. Cl.[2] G11C *27/02*; H03K *5/20*

U.S. Cl. 307—353 **3 Claims**



1. In a sample and hold circuit comprising an error amplifier to receive an input signal, an output amplifier, an integrating component connected to said output amplifier, said output amplifier being responsive to the output of the error amplifier, and said output amplifier supplying feedback to the input of the error amplifier, the improvement comprising:

an amplifier responsive to the output of the error amplifier for supplying feedback to the input of the error amplifier to reduce the output of the error amplifier to approximately zero volts; and

an isolation device connected between said error amplifier and said output amplifier for isolating the input of the output amplifier from the output of the error amplifier when the output of the error amplifier is reduced to approximately zero volts.

4,091,298

CRYOGENIC CURRENT LEAD CONSTRUCTION WITH SELF-CONTAINED AUTOMATIC COOLANT VAPOR FLOW CONTROL

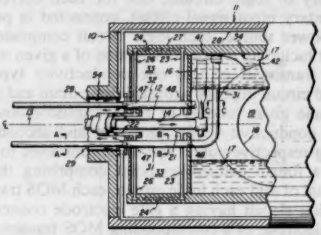
Bruce B. Gamble, Elnora, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 18, 1975, Ser. No. 641,836

Int. Cl.[2] H02K *9/00*

U.S. Cl. 310—52 **11 Claims**

1. In a superconducting rotor wherein means are connected to said rotor for rotation thereof, means are provided in flow communication with the rotor winding chamber of said rotor to supply liquefied gas thereto as the coolant for maintaining rotor windings disposed therein submerged at least in part in a pool of liquefied gas and at cryogenic temperatures, means are provided in flow communication with said rotor winding chamber for withdrawing coolant vapor therefrom, and means electrically connected to said rotor windings are provided to carry current between a current distribution device at room temperature and said rotor windings at cryogenic temperatures, the improvement wherein a portion of each current-carrying means is provided with means open at both ends for conducting a confined flow of coolant vapor along and in contact with said current-carrying means, said means for conducting coolant vapor being in flow communication at one open end thereof with some part of said means for withdrawing coolant vapor;



said portion having a terminal length thereof extending into said rotor winding chamber, said terminal length being disposed in the generally radial direction locating the other open end of said means for conducting coolant vapor adjacent the wall of said rotor winding chamber, said other open end being submerged below the surface of said pool of liquefied gas during operation to enable liquefied gas to freely enter therein, whereby cooling vapor can be generated by the transfer of heat from said current-carrying means to the liquefied gas within said means for conducting coolant vapor, said vapor so generated being trapped within said means for conducting coolant vapor for transport to said one open end, whereby said current-carrying means is cooled.

4,091,299

DEVICE TO ELECTRICALLY CONNECT ROTOR WINDING OF SYNCHRONOUS ELECTRICAL MACHINE TO EXCITER

Vladimir Stepanovich Vitchenko, Vitebsky prospekt, 29, korpus 2, kv. 142; Gennady Konstantinovich Smirnov, Prazhskaya ulitsa, 120, kv. 132, and Vladimir Grigorievich Shalaev, Novoizmailovsky prospekt, 55, kv. 92, all of Leningrad, U.S.S.R.

Filed Dec. 16, 1976, Ser. No. 751,350

Int. Cl.[2] H02K *13/00*

U.S. Cl. 310—71 **7 Claims**

1. In a system including

a synchronous electrical machine having

a rotor with

a winding,

a shaft with

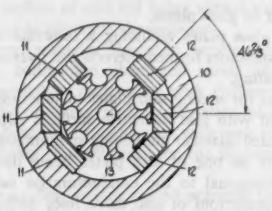
an axial bore, and

a first half-sleeve mounted on said shaft;
an exciter having
a rotor;
a shaft with
an axial bore and
a second half-sleeve mounted on said shaft; and
bolts to join said first and second half-sleeves;
a device to electrically connect said winding of said rotor of said synchronous electrical machine to said exciter, comprises:
at least one pair of current-conducting rods extending from said winding of said rotor of said synchronous electrical machine towards said exciter and arranged in said axial bore of said shaft of said synchronous electrical machine, each of said current-condicting rods being bent at a right angle and forming a contact surface shaped like a tapered plate;
at least one pair of current-conducting rods extending from said exciter towards said winding of said rotor of said synchronous electrical machine and arranged in said axial bore of said shaft of said exciter;
two profiled spacers of an insulation material insulating said tapered plates from said shaft of said synchronous electrical machine and said first half-sleeve,
said profiled spacers enveloping said plates and being shaped similarly to said plates;
two current-conducting wedges having two supporting surfaces,
a first of said supporting surfaces of each current-conducting wedge being in contact with the tapered surface of a respective plate;
two insulation spacers arranged between said shaft of said exciter and a second of said supporting-surfaces of each of said current-conducting wedges;
two flexible buses assembled into a pack and arched, said buses permanently connecting said current-conducting rods extending from the exciter to said current-conducting wedges; and
a central insulation spacer arranged between said diametrically opposite current-conducting wedges and said flexible buses.

4,091,300
PERMANENT MAGNET ELECTRICAL MACHINES

Ronald Lynch, Hemel Hempstead, and John Harold Purcell, Dunstable, both of England, assignors to Lucas Industries Limited, Great Britain

Filed Aug. 24, 1976, Ser. No. 717,146
Claims priority, application United Kingdom, Aug. 30, 1975, 35847/75; Oct. 8, 1975, 41387/75
Int. Cl.² H02K *21/28*
U.S. Cl. 310—154 **4 Claims**

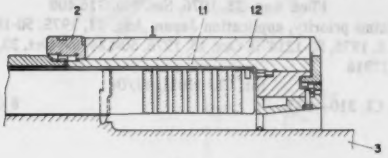


1. A permanent magnet electrical machine comprising:
a. a housing of magnetic material;
b. an armature rotatably supported in the housing and incorporating a rotor having teeth and windings on said rotor; and
c. two groups of magnets in the housing and magnetically coupled thereby, each magnet of each group having flat spaced parallel pole faces, the magnets of each group being arranged side by side with pole faces of the same polarity innermost and spaced around the armature axis at an angle different from the angular pitch of the teeth of the rotor, said angle defined by the expression $(360/n)(1 \pm \frac{1}{2}M)$, where n is the number of teeth on the rotor and M is the number of magnets in each group.

4,091,301
ROTOR END-WINDING SUPPORT FOR HIGH-SPEED ELECTRICAL MACHINE SUCH AS A TURBO-GENERATOR

Karl Blank, Mannheim, Germany, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Continuation of Ser. No. 486,438, Jul. 8, 1974, abandoned. This application Feb. 13, 1976, Ser. No. 658,023
Int. Cl.² H02K *3/46*
U.S. Cl. 310—270 **8 Claims**

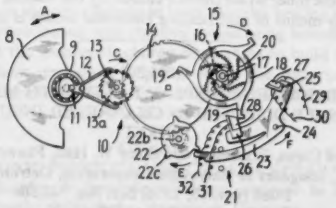


1. In a rotor end-winding support for a high-speed electrical machine, such as a turbogenerator, an overhung rotor end bell structure surrounding said end winding comprising an inner cylindrical ring extending over the entire axial length of said end winding and which is made from a high strength but easily machineable and shrinkable antimagnetic metallic material, one end of said inner ring being shrunk onto the body of the rotor at the axially inner end of said end-winding and the other end thereof surrounding the rotor shaft with radial clearance, an outer cylindrical ring extending over the entire axial length of said inner ring, said outer ring being made from an antimagnetic material of higher strength than said inner ring and having a high ratio of strength to specific weight, means for introduction of a pressurized hydraulic fluid into the interface between said inner and outer rings for expanding said outer ring to a diameter enabling it to be fitted upon said inner ring, and means for interlocking the end of said inner ring at the axially inner end of said end-winding with said rotor body.

4,091,302
PORTABLE PIEZOELECTRIC ELECTRIC GENERATING DEVICE

Shiro Yamashita, 6-31-1, Kameido, Koto-ku, Tokyo, Japan

Filed Apr. 15, 1977, Ser. No. 788,015
Claims priority, application Japan, Apr. 16, 1976, 51-43902
Int. Cl.² H01L *41/10*
U.S. Cl. 310—339 **13 Claims**



1. A portable electric generating device comprising an oscillatable weight rotatably supported for rotation in either direction by changes in position of said device, rotation converting means for converting oscillation of said oscillatable weight into rotation in one direction, a rotatably supported energy storing

wheel comprising an input portion driven by said rotation converting means, an output portion and elastic means connecting said input and output portions, control means for restraining rotation of said output portion of said energy storing wheel until predetermined energy has been stored in said elastic means and then releasing said output portion, a piezoelectric element, and means energized by rotation of said output portion of said energy storing wheel to strike said piezoelectric element and thereby generate electrical energy.

4,091,303

PIEZOELECTRIC QUARTZ VIBRATOR WITH HEATING ELECTRODE MEANS

Chiba Tadataka, and Kurashige Masakazu, both of Kabushiki-Kaisha Kinsekisha-Kenkyujo, 23-17, Miyasaka 2-chome, Setagaya-ku, Tokyo, Japan

Filed Aug. 23, 1976, Ser. No. 716,408

Claims priority, application Japan, Aug. 21, 1975, 50-101790; Oct. 8, 1975, 50-121470; Oct. 15, 1975, 50-124769; Oct. 23, 1975, 50-127916

Int. Cl.² H01L *41/04*

U.S. Cl. 310—343 **8 Claims**

1. A piezoelectric quartz vibrator which commprises an orbicular quartz plate cut in parallel to XZ'-plane of a quartz crystal, excitation electrode means of a substantially round form provided on and along the central areas of the major faces of the quartz plate, and heating electrode means to maintain the quartz plate at a desired temperature, a said heating electrode means being in a form of a circular arc provided on and along said major face and concentrically to and apart from said excitation electrode means, and a said heating electrode means extending exclusively within an angular range of $\pm 80°$ as measured from the Z'-axis including the center of said excitation electrode means of the quartz crystal, where a counterclockwise direction in the first quadrant or a clockwise direction in the second quadrant is indicated at the positive sign, and a counterclockwise direction in the third quadrant and a clockwise direction in the fourth quadrant is indicated at the negative sign, in which quadrants are taken said center of said excitation electrode means for the origin, said Z'-axis for the abscissa and the X-axis of the quartz crystal for the ordinate; whereby change in the resonant frequency of the quartz plate due to the inner strain thereof caused by the heating the quartz plate by means of said heating electrode means is minimized.

4,091,304

GAS DISCHARGE DISPLAY PANEL WITH MERCURY CAPSULE DISPOSED IN CHANNELED INSULATING SHEET

Bernard Caras, Princeton, and Stacy W. Hall, Fanwood, both of N.J., assignors to Burroughs Corporation, Detroit, Mich.

Filed Nov. 19, 1976, Ser. No. 743,506

Int. Cl.² H01J *61/20, 61/30*

U.S. Cl. 313—174 **2 Claims**

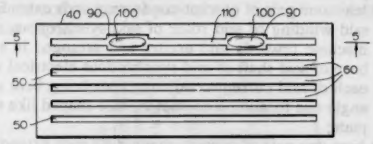
1. A display panel comprising

a gas-filled envelope including a base plate and a face plate hermetically sealed together, said face plate having a viewing window,

a plurality of cathode strips disposed vertically and parallel to each other on the surface of said base plate in said envelope,

anode electrode means in operative relation with said cathode strips,

an insulating sheet having a plurality of first horizontal channels defining a display area seated on said cathode strips between said base plate and face plate, there being vertical gas flow paths extending along said cathode strips beneath said insulating sheet,



said channels defining rows of operating cathode areas and subdividing said cathode strips into columns of operating cathode areas,

an auxiliary channel in said insulating sheet disposed parallel to said first channels, and

a source of mercury which comprises a mercury capsule disposed in said auxiliary channel and communicates from said auxiliary channel to said vertical gas flow paths.

4,091,305

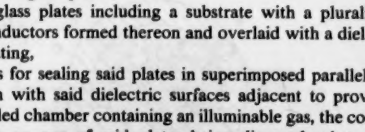
GAS PANEL SPACER TECHNOLOGY

Neil Myron Poley, Kingston, and Marvin Benjamin Skolnik, Poughkeepsie, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 647,681, Jan. 8, 1976, abandoned. This application Jan. 3, 1977, Ser. No. 756,525

Int. Cl.² H01J *61/30*

U.S. Cl. 313—220 **11 Claims**



2. A gaseous discharge display device comprising in combination,

a pair of glass plates,

said glass plates including a substrate with a plurality of conductors formed thereon and overlaid with a dielectric coating,

means for sealing said plates in superimposed parallel relation with said dielectric surfaces adjacent to provide a sealed chamber containing an illuminable gas, the conductors on one of said plates being disposed substantially orthogonal to the conductors on said other plate, the intersections of said drive lines defining discharge sites, and

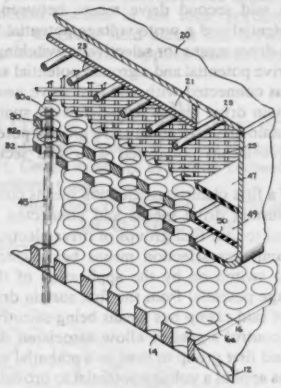
spacer means for maintaining a uniform discharge gap between opposite dielectric surfaces,

said spacer means comprising a plurality of metallic spacer elements positioned on predetermined conductors on at least one of said plates within said chamber, the height of said spacer elements corresponding to said uniform discharge gap, said spacer elements having a configuration adapted to fit on said predetermined conductors without restricting the flow of particles within said chamber.

4,091,306
AREA ELECTRON GUN EMPLOYING FOCUSED CIRCULAR BEAMS

William Hant, Los Angeles, Calif., assignor to Northrop Corporation, Los Angeles, Calif.

Filed Feb. 7, 1977, Ser. No. 766,362
Int. Cl.[2] H01J *29/50*
U.S. Cl. 313—409 7 Claims



1. An area electron gun for providing a uniform flow of electrons over a predetermined area comprising:

a plurality of thermionic filaments arranged in an array to cover said predetermined area,

a spreader electrode comprising a flat plate positioned on one side of said filaments,

an accelerator grid member positioned on the other side of said filaments,

a focusing plate having a plurality of apertures formed therein and positioned on the side of said grid member away from said filaments,

a collimation plate having a plurality of apertures formed therein and positioned on the side of said focusing plate away from said grid member,

an anode comprising a flat foil positioned on the side of said collimation plate away from said focusing plate, said foil forming a septum through which electrons emitted by the filament pass, and a support structure for said foil comprising a flat plate having a plurality of apertures formed therein and located between the foil and the collimation plate, one flat surface of said foil being spread over said support structure in abutment thereagainst,

said filament array, spreader electrode, accelerator grid, focusing plate, collimation plate, and anode all being substantially parallel to each other with corresponding apertures of said focusing plate, collimation plate and anode support structure being aligned with each other to form electron beam channels between the filaments and the anode,

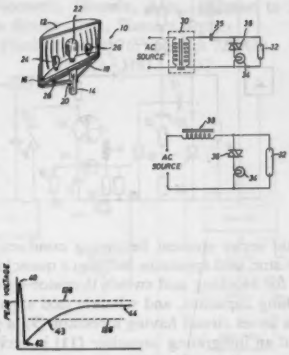
means for applying a first predetermined potential between the filaments and the anode, and a second predetermined potential between the grid member and the filaments, to accelerate electrons emitted by the filaments towards the anode, and

means for applying predetermined potentials to the focusing and collimation plates so as to focus the electrons in beams through said channels and minimize the impingement of electrons on the support structure, the focusing plate and the collimation plate, thereby minimizing the dissipation of beam energy and the generation of heat.

4,091,307
EMERGENCY LIGHTING SYSTEM FOR GASEOUS-DISCHARGE LAMPS

Albert C. McNamara, Jr., Houston, Tex., assignor to Esquire, Inc., New York, N.Y.

Continuation of Ser. No. 231,870, Mar. 6, 1972, abandoned, which is a continuation of Ser. No. 13,519, Feb. 24, 1970, abandoned, which is a division of Ser. No. 728,970, May 14, 1968, Pat. No. 3,517,254. This application Jan. 2, 1974, Ser. No. 429,991
The portion of the term of this patent subsequent to Jun. 23, 1987, has been disclaimed.
Int. Cl.[2] H05B *41/46*
U.S. Cl. 315—92 3 Claims



1. In combination with a gaseous-discharge lamp having a first main electrode and

a second main electrode, and

a current-limiting ballast means connected to at least one of said first and second main electrodes,

an emergency heating circuit, comprising

voltage breakdown means having a threshold level greater than the normal operating voltage across the gaseous-discharge lamp and less than the necessary peak starting voltage applied to the gaseous-discharge lamp, and

heat-producing resistive means connected to form a series combination with said voltage breakdown means, said series combination being connected in parallel across the gaseous-discharge lamp,

operating voltage applied across the ballast means and the gaseous-discharge lamp establishing a voltage across said voltage breakdown means below its threshold level while there is conduction between the first and second main electrodes,

momentary interruption of operating voltage causing a period of cessation of such conduction resulting in voltage being applied across said voltage breakdown means above its threshold level, thereby heating up said resistive means, said resistive means being housed adjacent the gaseous-discharge lamp so as to build up the ambient temperature thereof above the required temperature level for starting the gaseous-discharge lamp.

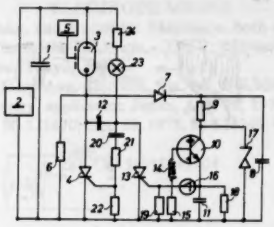
4,091,308
ELECTRONIC PHOTOGRAPHIC FLASH APPARATUS

Arthur Schneider, Volkenrode, Germany, assignor to Rollei-Werke Franke & Heidecke, Brunswick, Germany

Continuation-in-part of Ser. No. 566,531, Apr. 8, 1975, abandoned. This application Nov. 22, 1976, Ser. No. 743,652
Claims priority, application Germany, Apr. 10, 1974, 2417416
Int. Cl.[2] H05B *41/32*
U.S. Cl. 315—151 10 Claims

3. Photographic flash apparatus having a storage capacitor

with a discharge circuit including a flash tube element and a switch element in series with each other, means for rendering one of said series elements conductive first and the other of said series elements conductive later, exposure metering and flash limiting means, and means for providing a feed voltage for said exposure metering and flash limiting means, said photographic flash apparatus being characterized by a series circuit in parallel with said series element becoming conductive later, said series circuit including a diode and a feed capacitor in series with each other and arranged so said feed capacitor charges upon conduction of said series element that conducts first, and means for supplying said exposure metering and flash limiting means with feed voltage from said feed capacitor,



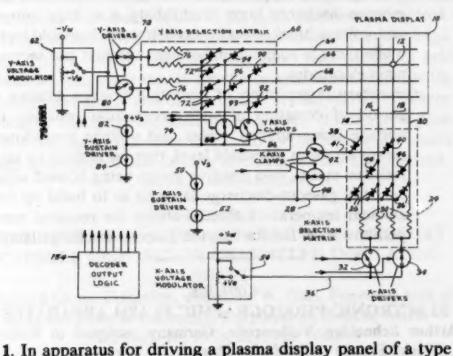
wherein said series element becoming conductive later is a switch thyristor, said apparatus includes a quenching capacitor and means for blocking said switch thyristor by current from said quenching capacitor, and wherein said apparatus further comprises a series circuit having a resistor (9), a phototransistor (10) and an integrating capacitor (11) in series with each other and in parallel with said feed capacitor, said resistor (9) being connected with the collector of said phototransistor and said integrating capacitor being connected to the emitter of said phototransistor, a threshold switch (16), and a circuit connecting the junction between said emitter and said integrating capacitor to said threshold switch and connecting said threshold switch to the control gate of said quenching thyristor.

4,091,309

PLASMA DISPLAY DRIVE CIRCUIT

Richard Albert Strom, Eagan, Minn., assignor to Control Data Corporation, Minneapolis, Minn.

Filed May 9, 1977, Ser. No. 794,881
Int. Cl.[2] H05B *37/00, 39/00, 41/00*
U.S. Cl. 315—169 TV **4 Claims**



1. In apparatus for driving a plasma display panel of a type having a plurality of drive electrodes comprising a first group and a second group of drive electrodes in generally orthogonal relationship to said first group in matrix arrangement and in which orthogonal pairs of said drive electrodes uniquely specify all display elements in the panel, and wherein said apparatus includes first drive means for selectively providing voltages in matrix interconnection to said first group of drive lines and second drive means for selectively providing voltages in matrix interconnection to said second group of drive lines, wherein the improvement comprises:

a first voltage modulator means connected with said first drive means for selectively switching a supply voltage to said first drive means between an erase voltage potential and a write voltage potential,

a second voltage modulator means connected with said second drive means for selectively switching a supply voltage to said second drive means between an erase voltage potential and a write voltage potential,

a first sustain drive means for selectively switching between a sustain drive potential and a ground potential said sustain drive means connected with said first drive means,

a second sustain drive means for selectively switching between a sustain drive potential and a ground potential, said sustain drive means connected with said second drive means,

a plurality of a first clamp bus selection means connected to said first sustain drive means and connected in matrix arrangement to said first groups of drive electrodes, each of said clamp bus selection means being automatically actuated to switch on by the application of the sustain drive voltage potential from the first sustain drive means and each of said clamp bus means being selectively actuable by a control signal to allow associated drive electrodes of said first group to float to a potential as said first drive means applies a voltage potential to provide selected electrodes of said first group, and

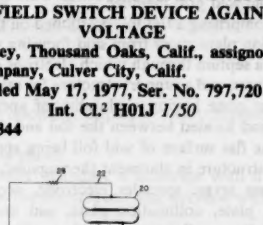
a plurality of a second clamp bus selection means connected to said second sustain drive means and connected in matrix arrangement to said second group of drive electrodes, each of said clamp bus selection means being automatically actuated to switch on by the application of the sustain drive voltage potential from the second sustain drive means and each of said clamp bus means being selectively actuable by a control signal to allow associated drive electrodes of said second group to float to a potential as said second drive means applies a voltage potential to provide selected electrodes of said second group.

4,091,310

METHOD AND APPARATUS FOR ON-SWITCHING IN A CROSSED-FIELD SWITCH DEVICE AGAINST HIGH VOLTAGE

Robin J. Harvey, Thousand Oaks, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed May 17, 1977, Ser. No. 797,720
Int. Cl.[2] H01J *1/50*
U.S. Cl. 315—344 **8 Claims**



3. A crossed-field switch device comprising:

an anode;

a cathode spaced from said anode to define an interelectrode space therebetween and define a continuous closed path between said electrodes;

means for maintaining a gas at reduced pressure in said interelectrode space;

means for applying a main magnetic field in a portion of said interelectrode space in a direction at an angle to the minimum interelectrode direction and at an angle to the continuous closed path so that the main magnetic field extends around the closed path of said interelectrode space; and

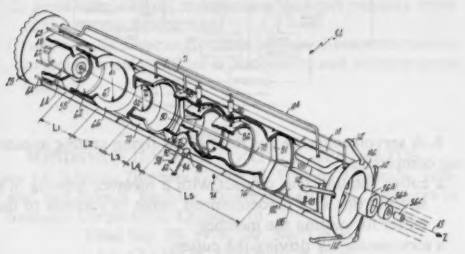
means for producing an auxiliary magnetic field in an adjacent portion of said interelectrode space of sufficient strength to cause cascading ionization glow discharge in a local portion of said interelectrode space so that electric conduction initiates in the local portion adjacent said auxiliary magnetic field means and between said anode and cathode to reduce applied interelectrode potential.

4,091,311

MODULATABLE, HOLLOW BEAM ELECTRON GUN

Charles Mendelsohn, Monsey, N.Y., and Holger Martin Luther, Westport, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 17, 1976, Ser. No. 751,561
Int. Cl.[2] H01J *29/58*
U.S. Cl. 315—382 **7 Claims**



1. A modulatable, hollow beam electron gun apparatus having an electron-optical (E-O) column for providing a hollow electron beam of instantaneous average diameter determined by instantaneous inner diameter and outer diameter values, for use in a CRT which provides a visual image in response to video signals, bias voltage signals, anode voltage signals, and a pair of concurrent beam modulation signals presented thereto from a system having a source of video signals, a source of bias signals, a source of anode voltage signals, and a source of concurrent modulation signals, comprising:

cathode assembly means, disposed at one end of a longitudinal axis of the E-O column and connected for response to the video source, said cathode means having an electron emitting surface adapted for providing a hollow electron beam of determined inner and outer diameter at a current density in dependence on the video signal magnitude;

control grid means, disposed along a successive portion of said longitudinal axis coaxially with, and adjacent to, the electron emitting surface of said cathode means and connected for response to the bias voltage source, said control grid means providing modulation of the electron beam current density in response to the magnitude of the bias voltage signals, in cooperative relationship with said cathode means;

first anode means, coaxially disposed along another successive portion of said longitudinal axis adjacent to said control grid means and connected for response to the anode voltage source, said first anode means providing a first electrostatic field in response to the magnitude of the anode voltage signal, said first electrostatic field being relatively positive with respect to said cathode means and said control grid to provide acceleration of the hollow electron beam emitted by said cathode means; and

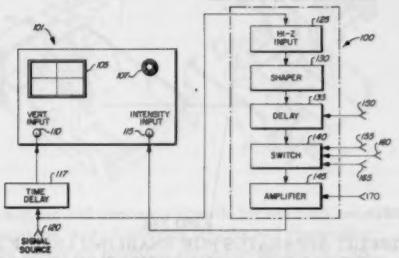
electrostatic coaxial lens means, coaxially disposed along another successive portion of said longitudinal axis adjacent to said first anode means and connected for response to the anode voltage source and to the source of concurrent modulation signals, said coaxial lens means providing further acceleration of the electron beam in response to the magnitude of the anode voltage signal, and said coaxial lens means providing a change in the instantaneous average diameter of the emitted electron beam in dependence on the magnitudes of the concurrent modulation signals.

4,091,312

CATHODE RAY DISPLAY INTENSITY MODULATOR

Samuel G. Raynovic, Phoenix, Ariz., assignor to Honeywell Information Systems Inc., Phoenix, Ariz.

Filed Oct. 4, 1976, Ser. No. 729,433
Int. Cl.[2] H01J *29/52*
U.S. Cl. 315—383 **3 Claims**



1. A cathode ray tube display intensity modulator comprising:

a high impedance input circuit for receiving electronic signals;

a signal shaper circuit connected to the high impedance circuit for processing the electronic signal;

a delay circuit for sychronizing an intensity modulation signal with the electronic signal displayed on the cathode ray tube;

a switching circuit connected to the delay circuit and responsive to a timing base input, a pulse width input, and a reference voltage input; and

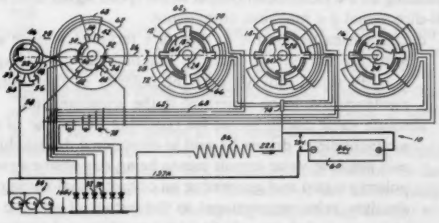
an amplifier circuit responsive to the output of the switch circuit for providing intensity modulation signals to the cathode ray tube.

4,091,313

CURRENT RECYCLING ELECTRIC MOTOR SYSTEM

Salvatore Genovese, 3744 Gunderson Ave., Berwyn, Ill. 60402

Filed Aug. 23, 1976, Ser. No. 716,382
Int. Cl.[2] H02K *13/00*
U.S. Cl. 318—439 **8 Claims**



1. An electric motor system comprising:

a plurality of axially aligned stators, each of said stators including at least one pair of spaced windings defining at least one pair of poles;

a motor shaft extending through said stators and mounted for rotation on the motor axis;

a plurality of rotors, each of said rotors disposed within a respective stator and mounted on said motor shaft angularly disposed with respect to the other rotors;

a source of current, said source having first and second poles, said first pole connected to one end of each of said windings;

commutator means sequentially connecting said second pole of said source of current to the other ends of each of said windings;

a plurality of diodes, each of said diodes connecting the other end of a respective winding to and poled toward said first pole of said source of current; and

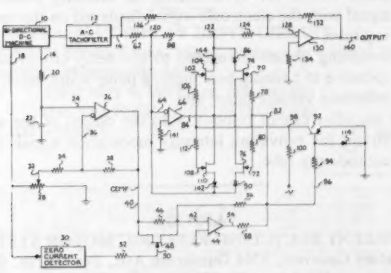
capacitance means connecting the junction of said diodes and said first pole of said source of current and the junction of said commutator means and said second pole of said source of current.

4,091,314

CIRCUIT APPARATUS FOR ENABLING USE OF AN A-C TACHOMETER AS THE SPEED SIGNAL FROM A BI-DIRECTIONAL D-C MACHINE

Chandler A. Johnson, Sussex, Wis., assignor to General Electric Company, Erie, Pa.

Filed Sep. 27, 1976, Ser. No. 726,566
Int. Cl.² H02P *7/00*
U.S. Cl. 318—464 **17 Claims**



1. Circuit apparatus for providing a signal indicative of speed and direction of rotation of a bi-directional d-c machine utilizing an a-c tachometer output as the speed signal from said bi-directional d-c machine, comprising:

circuit means responsive to armature terminal voltage and armature current of said d-c machine for providing a polarity signal indicative of the polarity of the counter electromotive force generated in the armature; and

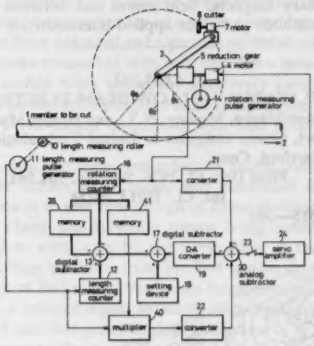
absolute value circuit means for receiving the output of the a-c tachometer driven by said bi-directional d-c machine, said absolute value circuit means being responsive to said polarity signal and generating an output signal having an absolute value proportional to the output of said a-c tachometer and the speed of said d-c machine and a polarity which is a function of the direction of rotation of said d-c machine.

4,091,315

SERVOMECHANISM FOR ROTARY TYPE FLYING CUTTING APPARATUS

Shigeki Hayashi, Tokyo; Kazukuni Noda, Fujisawa, and Shigeru Kusaka, Zama, all of Japan, assignors to Nusco Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 26, 1976, Ser. No. 708,528
Claims priority, application Japan, Jul. 31, 1975, 50-93733; Jul. 31, 1975, 50-93734
Int. Cl.² G05B *19/28*
U.S. Cl. 318—603 **14 Claims**



1. A servomechanism for rotary type flying cutting apparatus comprising:

a cutter rotating into contact with a member moving in a straight line in a predetermined range of rotation of the cutter for cutting the member;

a servomotor for driving the cutter;

a length measuring pulse generator for generating length measuring pulses corresponding in number to the distance of movement of the moving member;

a rotation measuring pulse generator for generating rotation measuring pulses corresponding in number to the rotation of the cutter;

subtracting means for obtaining the difference between the number of the length measuring pulses derived from the length measuring pulse generator and the number of the rotation measuring pulses derived from the rotation measuring pulse generator;

a setting device for setting therein a set length corresponding to a desired cutting length of the moving member;

a digital subtractor for detecting the set length and the result of subtraction by the subtracting means;

a D-A converter for converting the result of subtraction by the digital subtractor and supplying it as a control signal to the servomotor;

a memory for storing therein a corrected value corresponding to the component of unit distance of movement of the cutter in the direction of travel of the moving member with respect to each angular position of the cutter in the predetermined range of rotation of the cutter;

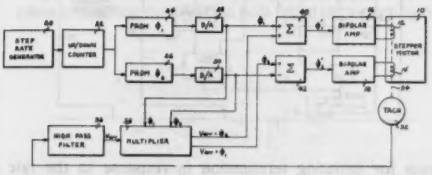
address signal generating means for generating an address signal for reading out the memory in accordance with the rotational angular position of the cutter in the predetermined range of rotation of the cutter; and

means for correcting the difference between the number of the rotation measuring pulses and the number of the length measuring pulses by the corrected value read out from the memory so that the distance of movement of the moving member and the component of the movement of the cutter in the direction of travel of the moving member may be equal to each other in the predetermined range of rotation of the cutter.

4,091,316
METHOD AND APPARATUS FOR DAMPING STEPPER MOTORS

David Friedman, Bedford, Mass., assignor to The Computervision Corporation, Bedford, Mass.

Filed Sep. 30, 1975, Ser. No. 620,125
Int. Cl.[2] G05B 19/40
U.S. Cl. 318—696 7 Claims



1. A method for damping a plural phase, incrementally driven stepper motor independently of the load thereon, said method comprising the steps of:

(1) generating command currents for driving the stepper motor;

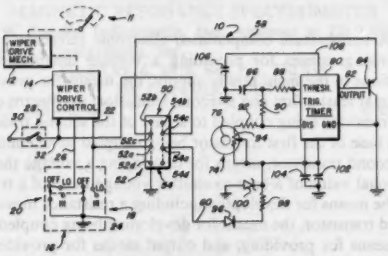
(2) generating a signal representing the shaft velocity error of the stepper motor; and,

(3) altering the phase angle of the command currents relative to their normal positions in response to said velocity error signal.

4,091,317
WINDSHIELD WIPER CONTROL APPARATUS

Leon M. Roszyk, Downers Grove; H. William Mammen, Hillside, and John B. Buchner, Crestwood, all of Ill., assignors to Sunbeam Corporation, Chicago, Ill.

Filed Sep. 23, 1976, Ser. No. 725,963
Int. Cl.[2] H02K 33/00; H02P 3/00
U.S. Cl. 318—369 18 Claims



1. A windshield wiper control system for selectively effecting operation of a windshield wiper electrical drive source and a windshield wiper drive mechanism at predetermined variable intervals comprising:

means for generating variable duration intervals and effecting operation of said windshield wiper electrical drive source at the end of each of said intervals;

adjustable means connected to said variable interval generating means for determining the duration of said variable duration intervals; and

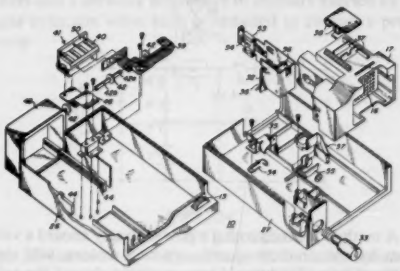
switch means for controlling the operation of said variable interval generating means and for directly effecting operation of said windshield wiper electrical drive source for one cycle of operation upon actuation of said control switch means from a first position corresponding to an off state to a second position corresponding to an operational state; said variable interval generating means being energized in said second position,

said control switch means comprising a three position switch, said third position being a momentary position which is contacted upon actuation of said control switch means from said off to said operational positions, said momentary contact position actuating said windshield wiper electrical drive source for said one cycle of operation as said control switch means is moved from said off to said operational state.

4,091,318
CHARGER/CONVERTER CONSOLE WITH REEL ARRANGEMENT

Jay Harris Eichler, Boca Raton, and Bernard Gasparaitis, Ft. Lauderdale, both of Fla., assignors to Motorola Inc., Schaumburg, Ill.

Filed Feb. 16, 1977, Ser. No. 769,084
Int. Cl.[2] B65H 75/48; H01B 1/38
U.S. Cl. 320—2 15 Claims



1. A charging and converter console for use with insertable communications unit of differing lengths and comprising:

housing means for receiving the communications units;

a source of charging current;

insulating means movably supported within the housing means;

contact means fixedly mounted on the insulating means;

spool means mounted within the housing means for rotational motion and for motion along the line of insertion of the communications units;

flexible circuit means double wound on a first half of the spool means and connected to couple the charging current source to the contact means; and

constant force spring means double wound on a second half of the spool means and attached to the housing means and to the insulating means, for winding up the flexible circuit means, and for biasing the insulating means to an initial position.

13. A reel mechanism for winding and unwinding an elongated strip of flexible material and comprising:

a mounting surface;

a supporting structure, slideably mounted on the mounting surface for motion along a predetermined line;

spool means, rotatably and slideably mounted on the mounting surface for motion along the predetermined line and having two elongated slots through and parallel to the axis thereof, said slots being spaced apart along said axis, one of said slots receiving a middle portion of the flexible strip; and

double wound constant force spring means having an unstressed middle portion received in the other of said slots in the spool means, and having prestressed end portions, one end portion being stressed in a sense opposite to that of the other end portion, the end portions tending to wind around the spool means in the same direction;

one end of the flexible strip and one end of the spring means being fixedly attached to a predetermined position on the mounting surface, and the other end of the flexible strip and the other end of the spring means being fixedly attached to the supporting structure for extending the flexible strip and the spring means by movement of the supporting structure away from the predetermined position,

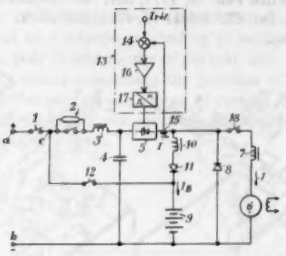
the spring means providing motive force for winding the flexible strip onto the spool means and for moving the supporting structure toward the predetermined position.

4,091,319

METHOD AND APPARATUS TO RECHARGE A BATTERY ABOARD AN ELECTRIC VEHICLE

Phi Duy Nguyen, Asnieres, France, assignor to Societe de Traction Cem - Oerlikon, Paris, France

Filed Dec. 23, 1976, Ser. No. 753,870
Claims priority, application France, Jan. 23, 1976, 76 01824
Int. Cl.² B60L *1/00*; H02P *1/00*
U.S. Cl. 320—9 **9 Claims**



1. A method for recharging a power supply aboard a vehicle driven by one or more electric traction motors, said motors capable of being fed by said power supply aboard the vehicle in an autonomous operating mode or by an exterior power supply source through an energy regulating circuit, said energy regulating circuit being utilized for feeding the said one or more electric traction motors and for recharging the power supply, said method being characterized in that said energy regulating circuit operates at a constant rate whereby the energy not absorbed by the said one or more electric traction motors is utilized to recharge the power supply aboard the vehicle.

3. Apparatus to recharge a power supply aboard a vehicle driven by one or more electric traction motors capable of being fed by said power supply aboard the vehicle in an autonomous mode or an exterior power supply source through an energy regulating circuit, said apparatus comprising two terminals adapted to be connected to said exterior power supply source; there being a series connection of a first switch, a protection circuit, an energy regulating control circuit to regulate the energy supplied to said motors, a first induction coil and at least one electric traction motor for the vehicle across said terminals; a free wheeling diode connected in parallel with said first induction coil and said motor, the said power supply aboard the vehicle being connected to the output of said energy regulating control circuit whereby said power supply is recharged at the same time as said at least one traction motor is fed, said apparatus being characterized in that a command circuit is associated with said energy regulating control circuit to assure that the output of the energy regulating control circuit has a constant current output.

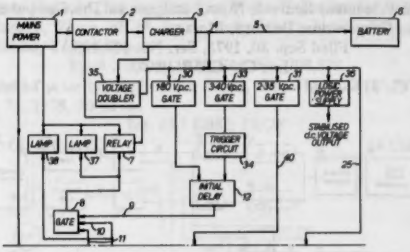
4,091,320

AUTOMATIC ELECTRIC BATTERY CHARGING APPARATUS

George William Foster, Bolton, England, assignor to Chloride Group Limited, London, England

Continuation-in-part of Ser. No. 552,759, Feb. 25, 1975, Pat. No. 3,979,658. This application Aug. 18, 1976, Ser. No. 715,575
Int. Cl.² H02J *7/04*
U.S. Cl. 320—40 **12 Claims**

1. Automatic battery charging apparatus, including terminating means for terminating a phase of the charge when the rate of rise of a control signal varying with battery voltage falls below a given value, including a voltage-controlled pulse generator controlled by the control signal to produce a train of pulses whose repetition rate varies with the control signal, and



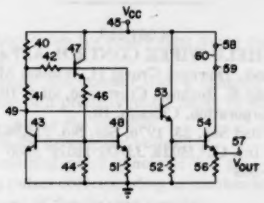
means for initiating termination in response to the rate of change of the said repetition rate falling below a given value.

4,091,321

LOW VOLTAGE REFERENCE

John Edward Hanna, Scottsdale, Ariz., assignor to Motorola Inc., Schaumburg, Ill.

Filed Dec. 8, 1976, Ser. No. 748,580
Int. Cl.² G05F *3/08*
U.S. Cl. 323—19 **9 Claims**



1. A temperature compensated electronic reference circuit comprising: means for providing a voltage independent of variations in the main power supply, the means for providing having at least a first and a second transistor, a collector of the first transistor being coupled to a base of the second transistor and a base of the first transistor being coupled to an emitter of the second transistor; means for developing a voltage that is a fractional value of a base-to-emitter voltage drop of a transistor, the means for developing including a resistance means and a third transistor, the means for developing being coupled with the means for providing; and output means for providing an output voltage, the output means being controlled by the voltage provided by the means for providing, the output means having at least one transistor to provide a base-to-emitter voltage drop which is subtracted from the voltage provided by the means for developing, the output voltage being substantially insensitive to temperature variations and being lower than silicon band-gap voltage.

4,091,322

EDDY CURRENT GENERATING TYPE METAL PIPELINE DETECTOR

Alain Stankoff, Clamart, France, assignor to Societe Intersub Developpement, Rungis Cedex, France

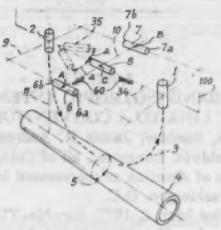
Filed May 2, 1977, Ser. No. 792,659
Claims priority, application France, May 24, 1976, 76 15679
Int. Cl.² G01V *3/10*; G01R *33/02*
U.S. Cl. 324—3 **14 Claims**

1. A metal detector, comprising
a framework having two spaced reference points,
first and second measuring devices mounted on the frame-

work and each arranged to sense the distance between a metal object to be detected and a corresponding one of the two reference points, each measuring device comprising

a transmitter having at least two substantially coplanar pole faces of opposite magnetic polarities for generating an alternating primary magnetic field to couple the metal object to be detected, and

a receiver including at least one detecting coil having a longitudinal axis which extends parallel to the common plane containing the said two pole faces, the detecting coil



being coupled by a secondary magnetic field generated by eddy currents induced in the metal object by the primary magnetic field to produce an output signal indicative of the magnitude of the field detected, and

processing means comprising

a subtractor coupled to receive the output signal of each receiver and to produce a difference signal indicative of a deviation of the detector from the metal object, and

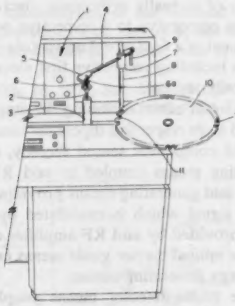
means providing an auxiliary signal representative of the magnitude of the secondary magnetic field at a point intermediate the two reference points.

4,091,323

AUTOMATED SAMPLE CHANGER FOR NUCLEAR MAGNETIC RESONANCE SPECTROMETER

Paul W. Landis, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Oct. 6, 1976, Ser. No. 730,035
Int. Cl.[2] G01R *33/08*
U.S. Cl. 324—.5 AH **6 Claims**



1. An automated apparatus for sequentially transferring samples to and from a Nuclear Magnetic Resonance (NMR) spectrometer which comprises:

a. a sample holding element having receptacles therein for disposing samples for NMR analysis and having indexing means associated and cooperating with said receptacles;

b. means powered by a first gas cylinder cooperating with said indexing means for advancing said holding element;

c. a positive stop cooperating with said indexing means to limit the advance of said holding element to one receptacle at a time;

d. a robot arm having a sample grasping means integral therewith, said arm being disposed in a cooperating relationship with said sample holding element which allows said arm to travel in an arc which positions said grasping means over a receptacle in said holding element at one end of said arc and over the sample receiving tube of said NMR spectrometer at the other end of said arc;

e. a second gas cylinder connected to said sample grasping means to operate said grasping means, a third gas cylinder connected to said robot arm to move said arm back and forth in said arc, and a fourth gas cylinder connected to said robot arm to move said arm up and down in a vertical plane; and

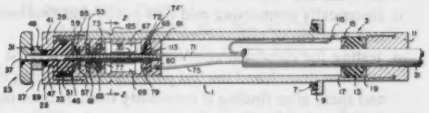
f. gas fluidic circuitry connecting each of said four gas cylinders into a network responsive to pressure exerted by said gas cylinders when each is extended to contact a pre-set stop.

4,091,324

CONDUCTIVITY CELL

Joseph M. Diamond, Brooklyn; Joseph T. Kuzmik, Sloatsburg; Horace A. Teass, Jr., Pleasantville, all of N.Y., and Patrick F. McKernan, Middletown, N.J., assignors to McNab, Incorporated, Mount Vernon, N.Y.

Filed Sep. 1, 1976, Ser. No. 719,598
Int. Cl.[2] G01N *27/42*
U.S. Cl. 324—30 B **6 Claims**



1. A conductivity cell for measuring the conductivity of a liquid stream comprising:

a generally elongated housing;

a plurality of cell components mounted in said housing;

a pair of spaced apart electrodes extending axially from said housing and adapted to be inserted in the liquid stream;

insulating and spacing means positioned between said electrodes and in contact therewith to insulate said electrodes from each other and to maintain them in stable axially spaced apart relationship;

an electrical conducting element mounted within said housing and extends therefrom and electrically connected and fixed to one of said electrodes;

said other electrode being mounted on said housing and insulated from said electrical conducting elements;

said electric conducting element being operable to maintain said one of said electrodes in engagement with said insulating and spacing means, and to maintain said insulating and spacing means in engagement with said other electrode;

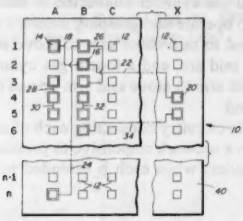
said insulating and spacing means is of rigid construction and is characterized by being formed of a ceramic material having good electrical insulation qualities, is strong and highly stable chemically and mechanically and is substantially unaffected by wide temperature variations to maintain and control the spaced apart relationship of the electrodes.

4,091,325

VERIFICATION TECHNIQUE FOR CHECKING WRAPPED WIRE ELECTRONIC BOARDS

Ira R. Marcus, Rockville, and Albert Lee, Takoma Park, both of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 8, 1977, Ser. No. 766,648
Int. Cl.² G01R *31/02*
U.S. Cl. 324—51 **10 Claims**



1. A technique for verifying the hard wiring of wrapped wire electronic boards, said boards comprising a substrate upon which are formed a plurality of electrically-conductive pins, groups of said pins being wired together to form a plurality of branches, each of said branches comprising at least a first pin and a last pin electrically wired to one another, said technique comprising the steps of:

a. testing for electrical continuity between the first pin and last pin of a first branch; then, after determining whether continuity does or does not exist,

b. testing for electrical discontinuity between said first pin of said first branch and the first pin of a succeeding branch; upon ascertaining whether there is or is not discontinuity between the branches,

c. electrically connecting said first pin of said first branch to said first pin of said succeeding branch;

d. testing for electrical continuity between said first pin of said first branch and the last pin of said succeeding branch; and then, after finding if continuity does or does not exist in the succeeding branch,

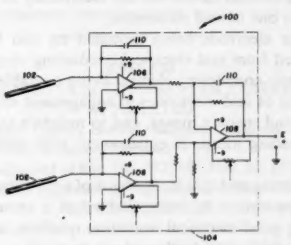
e. repeating the above steps b) through d) for each succeeding branch on the board.

4,091,326

METHOD AND APPARATUS FOR EQUIPOTENTIAL PLANE DETECTION

Maynard L. Hill, Silver Spring, Md., assignor to The Johns Hopkins University, Baltimore, Md.

Division of Ser. No. 301,363, Oct. 27, 1972, Pat. No. 3,868,074. This application Nov. 15, 1974, Ser. No. 524,334
Int. Cl.² G01R *31/02*
U.S. Cl. 324—72 **10 Claims**



1. A method of defining an equipotential line in a static electric field, comprising the steps of:

sensing the electrostatic potential at each of two spaced points in the field;

comparing the two sensed potentials to determine the difference in potential between the points; and,

adjusting the position of at least one of the points to cause the potential difference between the points to be zero, the line joining the two points being an equipotential line wherein the electrostatic potentials taken at every point on the line are essentially equal.

4,091,327

BROADBAND ISOTROPIC ANTENNA WITH FIBER-OPTIC LINK TO A CONVENTIONAL RECEIVER

Ezra B. Larsen, Boulder; James R. Andrews, Lafayette, and Eugene E. Baldwin, Longmont, all of Colo., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 2, 1977, Ser. No. 773,585
Int. Cl.² G01R *21/04, 31/00*
U.S. Cl. 324—95 **16 Claims**

1. A field intensity measuring system particularly adapted for near-zone electromagnetic fields comprising in combination:

a plurality of mutually orthogonal electrically short dipole antennas responsive to a respective orthogonal RF field component of a field of unknown polarization, each dipole antenna including respective first electrical circuit means interiorally thereof;

said first circuit means including RF amplifier circuit means coupled to its respective dipole antenna for amplifying the RF field component sensed thereby, and optical energy generating means coupled to said RF amplifier circuit means, said generating means providing an optical carrier output signal which is modulated by the amplified RF signal provided by said RF amplifier circuit means;

respective optical carrier guide means coupled to said optical energy generating means;

respective photo-detector means coupled to said optical carrier guide means and being operable to demodulate the RF modulated optical carrier signal translated thereby to provide respective field component RF signals;

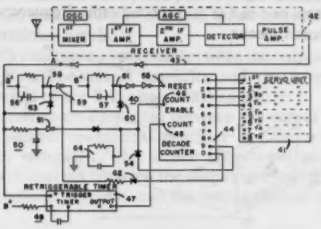
second circuit means coupled to said field component RF signals and being operative to provide a respective measured value signals thereof; and

third circuit means coupled to said second circuit means and being operative to process said measured values signals of said field component RF signals to provide a composite measured value signal indicative of the effective field intensity in the proximate region of said dipole antennas.

4,091,328
REMOTE CONTROL RADIO SYSTEM

Robert R. Hellman, Bridgeport, and Douglas M. French, Clinton, both of Conn., assignors to Westport International, Inc., Milford, Conn.

Filed Jun. 30, 1976, Ser. No. 701,434
Int. Cl.[2] H04B 7/00
U.S. Cl. 325—37 18 Claims

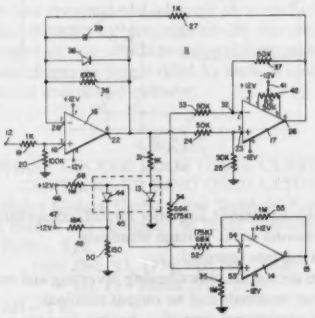


1. A remote control radio system for positioning a servo unit in accordance with the setting of an adjustable control comprising a transmitter having broadcast means for broadcasting a radio wave upon energization, means for energizing the brodcast means to provide a broadcast period and for effecting deenergization of the broadcast means to provide a silent period, means connected to the energizing means and the adjustable control for adjusting the silent period in accordance with the setting of the adjustable control; a receiver having radio receiving means for receiving the broadcasted wave and providing a detected signal having one state that exists while a broadcasted wave is being received and another state that exists when a broadcasted wave is not being received, means for receiving the detected signal and applying a control signal to the servo unit that has a duration essentially equal to the sum of the duration of the one state and the another state and means for delaying the control signal applying means from applying the control signal to the servo unit until at least two-thirds of the duration of the one state of the detected signal has expired, thereby reducing the possibility of interference by extraneous signals.

4,091,329
LOGARITHMIC CIRCUIT WITH WIDE DYNAMIC RANGE

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to the invention of; Paris H. Wiley, and Eugene A. Manus, both of Blacksburg, Va.

Filed Feb. 16, 1977, Ser. No. 769,149
Int. Cl.[2] H03K 17/00; G06G 7/24
U.S. Cl. 328—145 4 Claims

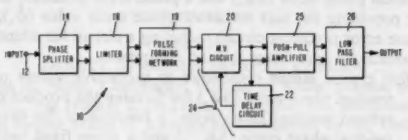


1. A circuit for deriving an output voltage that is proportional to the logarithm of an input voltage susceptible to wide variations in amplitude comprising a constant current source, said constant current source including: an amplifier having an input terminal connected to be responsive to the input voltage and an output terminal, a resistor connected in a shunt DC circuit with the output terminal, a DC negative feedback path between the output terminal and an input terminal of the amplifier, a non-linear element connected in a DC series circuit with the resistor as part of the shunt circuit, said feedback path including means for sensing the voltage across the resistor and for supplying an input terminal of the first amplifier with a negative feedback voltage that is responsive to the sensed voltage and substantially equal to the input voltage as coupled to the input terminal, said feedback voltage being subtracted by the amplifier from the input voltage as coupled to the input terminal, said sensing means including means for subtracting the combined voltage across the resistor and the non-linear element from the voltage across the element, and said non-linear element having a logarithmic output voltage versus input current response for all currents flowing through the resistor over the wide range of variations of the input voltage, whereby a voltage proportional to the input voltage is developed across the element.

4,091,330
CIRCUIT AND METHOD FOR DEMODULATING A FREQUENCY MODULATED SIGNAL

Tsuneyoshi Hidaka, Cupertino, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Sep. 15, 1977, Ser. No. 833,773
Int. Cl.[2] H03D 3/00; H03K 9/06
U.S. Cl. 329—107 11 Claims



1. A circuit for demodulating a frequency modulated signal embodying a frequency spectrum signal modulated on a carrier signal, said circuit comprising:

means for shaping the modulated signal into a series of voltage transitions having a pulse repetition rate proportional to that of the modulated signal;

a multivibrator switchable to a first state in response to the voltage transitions, said multivibrator providing a square-wave output signal at a pulse repetition rate proportional to that of the voltage transitions;

time delay means coupled between an output terminal of said multivibrator and an input terminal of said multivibrator for switching said multivibrator to a second state after a time delay determined by said time delay means;

means coupled in parallel with said time delay means for shorting said time delay means after said multivibrator has been switched to said second state such that said multivibrator is substantially immediately receptive to the next succeeding voltage transition; and,

means for integrating the square-wave output signal from said multivibrator so as to provide the frequency spectrum signal demodulated from the carrier signal.

4,091,331
ARRANGEMENT FOR COMPENSATING CARRIER PHASE ERRORS IN A RECEIVER FOR DISCRETE DATA VALUES

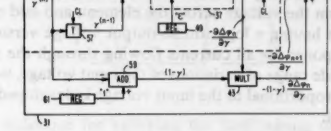
Hans-Peter Kaser, Thalwil, Switzerland; Philippe Thirion, St. Paul de Vence, France, and Gottfried Ungerböck, Adliswil, Switzerland, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 22, 1976, Ser. No. 753,387

Claims priority, application Switzerland, Dec. 31, 1975, 16930/75

Int. Cl.² H03D *3/00*; H04L *27/22*

U.S. Cl. 329—110 **6 Claims**



1. A circuit for adaptively generating a gain control factor (γ) for use in a phase error predictor circuit which includes circuit means responsive to the gain control factor (γ) for deriving an estimated phase error value ($\hat{\phi}n$) and said error predictor circuit being part of a feedback loop of a phase error compensating circuit in a receiver for receiving discrete data values under clock control which have been transmitted by modulating a carrier at discrete clock times, said receiver including; a phase correction circuit for correcting the phase of a previously equalized received signal (x_n) in accordance with said estimated phase error value ($\hat{\phi}n$) and providing a phase corrected received signal (y_n), a decision circuit responsive to said phase corrected received signal (y_n) for providing output data signals ($\hat{a}_n$) from said phase corrected values (y_n), and a feedback loop including a phase difference determining circuit responsive to the phase corrected received signal (y_n) and the output data signals ($\hat{a}_n$) for providing successive values of the residual phase error ($\Delta\phi_n$) and a phase error predictor circuit for providing the said estimated phase error value ($\hat{\phi}_n$); said phase error predictor circuit including a circuit for adaptively generating a gain factor (γ) and comprises:

first circuit means responsive to successive values of the residual phase error ($\Delta\phi_n$) for forming the product of the present residual phase error, a function of the previous residual phase error ($\Delta\phi_{n-1}$) and a given fixed value (ϵ) which is arbitrarily set between the value 0 and 1,

second circuit means for forming the sum of the product provided by the said first circuit means and a previous sum (gain factor γ^{n-1}) of the said second circuit means; and

third circuit means responsive to the sum provided by said second circuit means for limiting the output (gain factor γ) to a range between 0 and 1.

4,091,332
TRAVELING WAVE TUBE AMPLIFIER EMPLOYING FIELD EMISSION CATHODES

Walter Ellis Crandall, Malibu, Calif., assignor to Northrop Corporation, Los Angeles, Calif.

Filed Feb. 3, 1977, Ser. No. 765,197

Int. Cl.² H03F *3/58*

U.S. Cl. 330—43 **13 Claims**

1. A traveling wave tube amplifier for amplifying radio frequency energy comprising:

a plurality of field emission cathodes arranged in an array covering a predetermined area,

an anode positioned opposite said cathode array in spaced relationship thereto and covering an area substantially corresponding to said predetermined area,

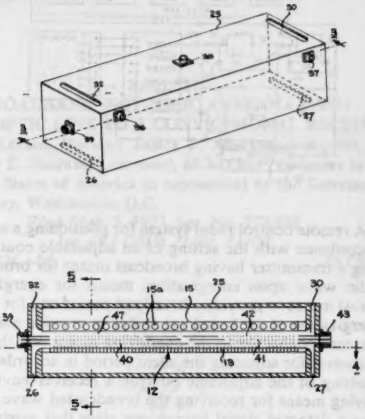
grid means placed between the cathodes and the anode,

first radio frequency energy transmission means formed between said cathodes and said grid means,

means for coupling radio frequency energy to be amplified solely to one end of said first radio frequency energy transmission means,

second radio frequency energy transmission means formed between the anode and the grid means, and

means for coupling out amplified radio frequency energy solely from one end of said second radio frequency energy transmission means,



there being potentials applied to the anode and grid means relative to the cathode to cause an electron flow from each of said cathodes to said anode, said electron flows being modulated by the radio frequency energy coupled to said first radio frequency energy transmitting means, the modulated electron flows being additively fed in phase with each other to said second radio frequency energy transmission means to provide the amplified output therefrom.

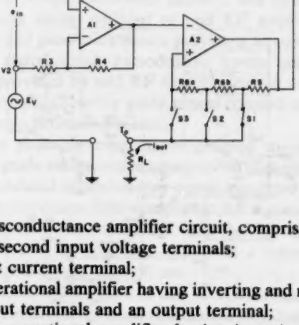
4,091,333
TRANSCONDUCTANCE AMPLIFIER CIRCUIT

Guy Carlyle Thrap, Del Mar, Calif., assignor to Valhalla Scientific Incorporated, San Diego, Calif.

Filed Jul. 25, 1977, Ser. No. 818,398

Int. Cl.² H03F *1/34*

U.S. Cl. 330—100 **2 Claims**



1. A transconductance amplifier circuit, comprising

first and second input voltage terminals;

an output current terminal;

a first operational amplifier having inverting and non-inverting input terminals and an output terminal;

a second operational amplifier having inverting and non-inverting input terminals and an output terminal, with the inverting input terminal of the second operational ampli-

fier being connected to the terminal of the first operational amplifier;

a first resistance connected between the first input voltage terminal and the non-inverting input terminal of the first operational amplifier;

a second resistance connected between the output terminal of the second operational amplifier and the non-inverting input terminal of the first operational amplifier;

a third resistance connected between the second input voltage terminal and the inverting input terminal of the first operational amplifier;

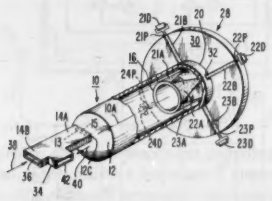
a fourth resistance connected between the output terminal of the first operational amplifier and the inverting input terminal of the first operational amplifier;

a fifth resistance connected between the output terminal of the second operational amplifier and the non-inverting input terminal of the second operational amplifier, and also connected between the output terminal of the second operational amplifier and the output current terminal.

4,091,334
CONNECTION OF A PLURALITY OF DEVICES TO A CIRCULAR WAVEGUIDE

Franco Nicola Sechi, Lawrenceville, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Jun. 28, 1977, Ser. No. 810,737
Int. Cl.[2] H03F 3/10; H01P 5/12
U.S. Cl. 330—287 **11 Claims**



1. Microwave apparatus comprising:

a cylindrical waveguide wherein microwave energy is transmitted via propagation of a circular wave in a TE_{01} mode;

a hollow cylinder made from a material with a permittivity greater than the permittivity of air, a surface of said cylinder being clad with an electrically conductive material that has a first and a second electrically non-conductive tapered slot, said slots being relatively wide at the distal end of said cylinder and relatively narrow at the proximal end thereof, the radius of the exterior surface of said cylinder being less than the radius of the interior surface of said waveguide; and

means connected to said waveguide and said cylinder for coaxially maintaining said cylinder within said waveguide with said proximal end adjacent to an end of said waveguide, whereby a propagation of the circular wave through said waveguide to said cylinder causes a portion of said energy to be provided by each of said slots at the proximal end of said cylinder.

4,091,335
PHASE LOCKED LOOP USING CURRENT CONTROLLED RING OSCILLATOR

William Henry Giolma, Garland, and Bernhard Hans Andresen, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallax, Tex.

Filed Dec. 13, 1976, Ser. No. 750,071
Int. Cl.[2] H03B 3/04, 5/02
U.S. Cl. 331—1 A **12 Claims**

1. A frequency synthesizer using a phase locked loop system including:

oscillator means for supplying an input reference signal;

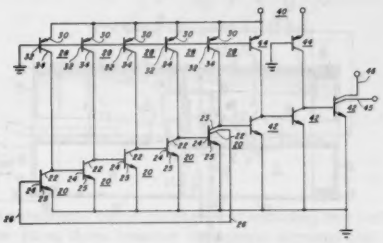
a closed loop circuit connected to said oscillator means including:

current controlled ring oscillator means,

phase detector means disposed between said oscillator means and said current controlled ring oscillator means for comparing the phase of the input reference signal with the phase of the output signal of said current controlled ring oscillator means, and generating an error voltage related to the difference in phase,

low pass filter means connected to said phase detector means for filtering said error voltage,

voltage converter means disposed between said low pass filter and said current controlled ring oscillator means for converting said error voltage to a proportional current,



a system feedback loop from said current controlled ring oscillator means to said phase detector means, and

frequency divider means disposed in said system feedback loop for increasing the frequency of the output signal of said current controlled ring oscillator means.

7. A current controlled ring oscillator comprising:

logic gate means for generating a time delay signal,

a feedback loop connected from the output of said logic gate means to the input of said logic gate means,

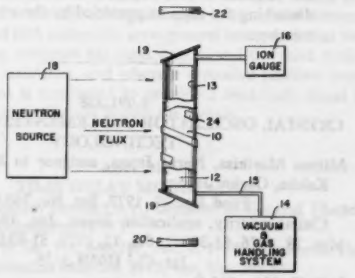
injection current means for introducing a control current into said logic gate means, and

output signal means connected to said logic gate means for delivery of an oscillating signal.

4,091,336
DIRECT NUCLEAR PUMPED LASER

George H. Miley, Champagne; William E. Wells, Urbana, both of Ill., and Russell J. DeYoung, Hampton, Va., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed May 27, 1976, Ser. No. 690,499
Int. Cl.[2] H01S 3/09
U.S. Cl. 331—94.5 P **5 Claims**



1. A laser system comprising, a gas laser structure including a laser cavity filled with a gaseous laser active material, said laser active material including a mixture of a majority gas and a minority gas, said mixture being chosen from the group

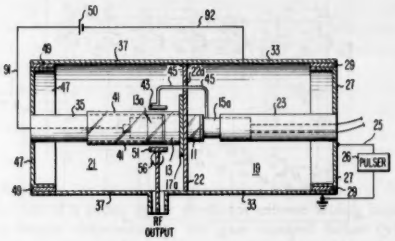
consisting of Ne-N_2 where Ne is the majority gas and He-CO where He is the majority gas, and radiation means for providing ionizing radiation to said gaseous laser active material.

4,091,337

COAXIAL CAVITY MICROWAVE OSCILLATOR WITH MANUALLY ADJUSTABLE CAPACITIVE FEEDBACK ELEMENT

LeRoy Francis Heckman, Jr., New Holland, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 15, 1976, Ser. No. 742,015
Int. Cl.² H03B *5/18*
U.S. Cl. 331—101 **5 Claims**



1. In a microwave oscillator of the type including an active device in a coaxial package comprising an input coaxial RF resonator and an output coaxial RF resonator with a common conductive wall separating the input and the output resonators, said active device including an input, an output and a common electrode with the common electrode coupled to the common wall, the input electrode coupled to the center conductor of the input resonator and the output electrode coupled to the center conductor of the output resonator, the improvement therewith for providing adjustable feedback comprising:

a wire-like coupling member of rigid conductive material connected at one end to the center conductor of the input resonator and extending in insulative manner through said common wall to a point closely spaced from the center conductor of the output resonator,

a sheet of conductive material fixed to the free end of said wire-like coupling member with said sheet closely spaced from the center conductor of said output resonator to provide capacitive coupling therewith, said sheet being thin and of a deformable material to permit the ends of said sheet to be easily bent toward and away from the center conductor of said output resonator to easily adjust the capacitive coupling provided by the sheet without disturbing the support provided by the wire-like coupling member.

4,091,338

CRYSTAL OSCILLATOR IMPLEMENTED WITH CMOS TECHNOLOGY

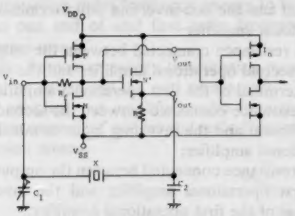
Mitsuo Morihisa, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jan. 19, 1977, Ser. No. 760,522
Claims priority, application Japan, Jan. 19, 1976, 51-5220; Mar. 18, 1976, 51-30041; Jul. 12, 1976, 51-83238
Int. Cl.² H03B *5/36*
U.S. Cl. 331—116 R **7 Claims**

1. An oscillator comprising:

a complementarily connected transistor amplifier which performs linear operation;

an impedance converter of which the input is connected to the output of the complementarily connected transistor amplifier, thereby stabilizing and reducing output impedance of the amplifier; and



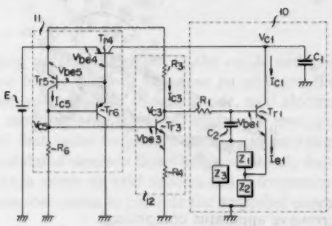
a quartz oscillator connected between the input of the complementarily connected transistor amplifier and the output of the output impedance converter.

4,091,339

OSCILLATOR

Takashi Sugimoto, and Kazumasa Noyori, both of Yokohama, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Tokyo, Japan

Filed Jan. 28, 1977, Ser. No. 763,552
Claims priority, application Japan, Jan. 30, 1976, 51-9145
Int. Cl.² H03B *5/12*
U.S. Cl. 331—117 R **16 Claims**



1. An oscillator which comprises

a D.C. power source having a first terminal connected to ground;

an oscillation circuit including a first oscillation transistor used as an active oscillation element, a first capacitor for connecting the collector of the first transistor to ground with respect to an A.C. signal, a tank circuit having first and second inductive impedance elements and capacitive impedance element, the junction of the first and second inductive impedance elements being connected to the emitter of the first transistor, and the junction of the first inductive impedance element and capacitive impedance element being connected to ground, an oscillation current feedback capacitor connected between the junction of the second inductive impedance element with the capacitive impedance element and the base of the first transistor, and a first emitter current-controlling resistor, one end of which is connected to the base of the first transistor;

a D.C. power source current-detecting circuit including a second resistor, one end of which is connected to a second terminal of power source and the other end of which is connected to the collector of the first transistor, and a second transistor whose emitter is connected to said one end of the second resistor and whose base is connected to said other end of the second resistor; and

a D.C. bias voltage-controlling circuit including a third transistor whose collector is connected to the other end of the first resistor and whose base in connected to the collector of the second transistor, a first potentiometer resis-

tor one end of which is connected to the collector of the third transistor, and the other end of which is connected to the second terminal of the power source; and

wherein the oscillation circuit, D.C. power source current-detecting circuit and D.C. bias voltage-controlling circuit collectively constitute a negative feedback loop of the D.C. power source current.

4,091,340

OSCILLATOR CIRCUIT ARRANGEMENTS INCLUDING NULLATOR-NORATOR PAIRS

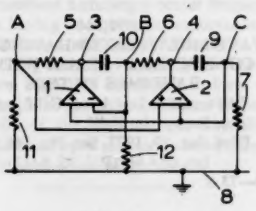
Alan John Greaves, Southall; Phillip Ernest Greenaway, Hatch End, and John Mortimer Rollett, London, all of England, assignors to The Post Office, London, England

Division of Ser. No. 554,592, Mar. 3, 1975, abandoned, which is a continuation of Ser. No. 299,931, Oct. 24, 1972, abandoned. This application Jun. 9, 1976, Ser. No. 694,293

Claims priority, application United Kingdom, Oct. 22, 1971, 49264/71

Int. Cl.² H03B *5/26*

U.S. Cl. 331—132 **1 Claim**



1. An oscillator circuit arrangement including two nullator-norator pairs, three resistive impedance elements and three selectable tuning elements arranged alternately in a ring to form a closed chain having six nodes, consisting of a first node, a second node, a third node, a fourth node, a fifth node and a sixth node, odd numbered nodes, one, three and five, being interconnected by two nullator means, and each of nodes two and four being connected to node six by a norator means and wherein two of said selectable tuning elements are capacitors and a third selectable tuning element is a resistive impedance element, in which the two nullator-norator pairs consist of a first and a second differential input operational amplifier, each having an inverting input, a non-inverting input and an output, and in which the non-inverting input of the second amplifier is connected to the first node; and output of the first amplifier is connected to the second node; the inverting input terminal of the first amplifier is connected to the third node; the output of the second amplifier is connected to the fourth node; the non-inverting input of the first amplifier and the inverting input of the second amplifier are directly connected together and are directly connected to the fifth node; and in which the first resistive impedance element is connected between the first and second nodes; the second resistive impedance element is connected between the third and fourth nodes; and the third resistive impedance element is connected between the fifth and sixth nodes; and in which a first of said selectable tuning elements is connected between the first and the sixth nodes; a second of said selectable tuning elements is connected between the second and third nodes; and a third of said selectable tuning elements is connected between the fourth and fifth nodes; the arrangement being such that two of said tuning elements are capacitances and the third tuning element is a resistance, and wherein a passive positive impedance element is connected to provide a feed-back signal to maintain stable oscillation within the circuit.

4,091,341

OSCILLATOR CIRCUIT ARRANGEMENTS INCLUDING NULLATOR-NORATOR PAIRS

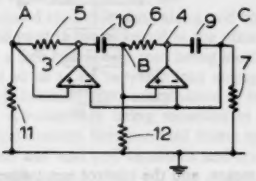
Alan John Greaves, Southall; Phillip Ernest Greenaway, Pinner, and John Mortimer Rollett, London, all of England, assignors to The Post Office, London, United Kingdom

Division of Ser. No. 554,529, Mar. 3, 1975, abandoned, which is a continuation of Ser. No. 299,931, Oct. 24, 1972, abandoned. This application Jun. 9, 1976, Ser. No. 694,292

Claims priority, application United Kingdom, Oct. 22, 1971, 49264/71

Int. Cl.² H03B *5/26*

U.S. Cl. 331—132 **1 Claim**



1. An oscillator circuit arrangement including two nullator-norator pairs, three resistive impedance elements and three selectable tuning elements arranged alternately in a ring to form a closed chain having six nodes, consisting of a first node, a second node, a third node, a fourth node, a fifth node and a sixth node, odd numbered nodes, one, three and five, being interconnected by two nullator means, and each of nodes two and four being connected to node six by a norator means and wherein two of said selectable tuning elements are capacitors and a third selectable tuning element is a resistive impedance element, in which the said two nullator-norator pairs consist of a first and a second differential input operational amplifier, each having an inverting input, a non-inverting input and an output, and in which the non-inverting input of the first amplifier is connected to the first node; the output of the first amplifier is connected to the second node; the non-inverting input terminal of the second amplifier is connected to the third node; the output of the second amplifier is connected to the fourth node; the inverting inputs of the first and second amplifiers are directly connected together and are directly connected to the fifth node; and in which the first resistive impedance element is connected between the first and second nodes; the second resistive impedance element is connected between the third and fourth nodes; and the third resistive impedance element is connected between the fifth and sixth nodes; and in which a first of said selectable tuning elements is connected between the first and sixth nodes; a second of said selectable tuning elements is connected between the second and third nodes; and a third of said selectable tuning elements is connected between the fourth and fifth nodes; the arrangement being such that two of said tuning elements are capacitances and the third tuning element is a resistance, and wherein a passive positive impedance element is connected to provide a feed-back signal to maintain stable oscillation within the circuit.

4,091,342

TIME DELAY MODULATOR

James R. Whitten, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 646,249, Jan. 2, 1976, abandoned. This application May 20, 1977, Ser. No. 798,844

Int. Cl.² H03C *3/10*

U.S. Cl. 332—29 R **4 Claims**

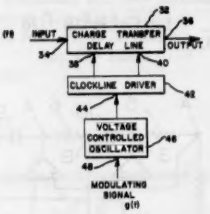
1. A time delay modulator for varying the instantaneous time base of a substantially sinusoidal carrier wave signal in accordance with a modulating signal, said modulator comprising:

a charge transfer delay line having an input, an output and a

control input, said input adapted to receive an unmodulated carrier wave signal wherein the rate of transfer of charge along said delay line is proportional to said modulating signal;

delay line driver means having an input and an output, the output connected to the control input of said delay line; and

a voltage controlled oscillator having a control input and an output, the output connected to the input of said delay line



driver means, and the control input adapted to receive a modulating signal, said modulating signal causing the output frequency of said oscillator to deviate from a nominal frequency by an amount proportional to the magnitude of said modulating signal, said modulating signal being an information signal of substantially lower frequency than said carrier wave signal, whereby the instantaneous time base of said carrier wave signal is varied by said delay line in accordance with the modulating signal and the output of said variable delay line is a frequency modulated signal.

4,091,343

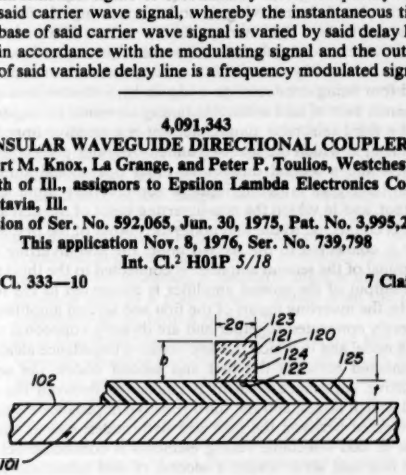
INSULAR WAVEGUIDE DIRECTIONAL COUPLER

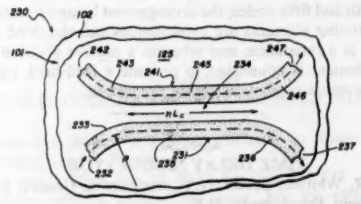
Robert M. Knox, La Grange, and Peter P. Toulios, Westchester, both of Ill., assignors to Epsilon Lambda Electronics Corp., Batavia, Ill.

Division of Ser. No. 592,065, Jun. 30, 1975, Pat. No. 3,995,238. This application Nov. 8, 1976, Ser. No. 739,798

Int. Cl.² H01P 5/18

U.S. Cl. 333—10 **7 Claims**





1. An insular waveguide directional coupler for use in the frequency range from about 1 GHz to about 1,000 GHz comprising a conductive image plane, a first length of elongated high permittivity dielectric waveguide of finite cross section adjacent to said conductive image plane, a second length of elongated high permittivity dielectric waveguide of finite cross section adjacent to said conductive image plane and spaced from said first length of waveguide to provide a coupling region therebetween, and a thin film of synthetic organic resin disposed between and secured to said conductive image plane and said lengths of waveguide and extending laterally beyond the said lengths of waveguide and into said coupling region, said thin film being low loss in character and having a low permittivity compared with that of said lengths of waveguide, said first length of waveguide having an inlet port at one end of said coupling region and spaced away from said second length of waveguide a distance substantially greater than the distance between said lengths of waveguide in said coupling region, said first and second lengths of waveguide having respectively first and second outlet ports at the other end of said coupling region and spaced from the other length of waveguide a distance substantially greater than the distance between the lengths of waveguide in said coupling region, all of the energy injected into said inlet port being coupled from said first length of waveguide across said coupling region to said second length of waveguide and out said second outlet port when said coupling region has a length equivalent to an odd number of coupling lengths and all of the energy injected into said inlet port being transmitted through said coupling region to said first outlet port when saud coupling region has a length equivalent to an even number of coupling lengths.

4,091,344

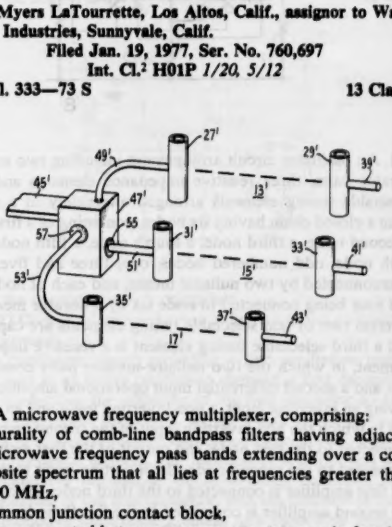
MICROWAVE MULTIPLEXER HAVING RESONANT CIRCUITS CONNECTED IN SERIES WITH COMB-LINE BANDPASS FILTERS

Peter Myers LaTourrette, Los Altos, Calif., assignor to Wavecom Industries, Sunnyvale, Calif.

Filed Jan. 19, 1977, Ser. No. 760,697

Int. Cl.² H01P 1/20, 5/12

U.S. Cl. 333—73 S **13 Claims**



10. A microwave frequency multiplexer, comprising:

a plurality of comb-line bandpass filters having adjacent microwave frequency pass bands extending over a composite spectrum that all lies at frequencies greater than, 100 MHz,

a common junction contact block,

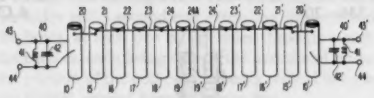
a wire connected between a resonator at one end of each of the comb-line filters and said contact block, thereby introducing an inductive coupling between one end of each of said comb-line filters and the contact block, and

each of the wires leading to the comb-lines having pass bands exceeding the lowest pass band being connected to said block by insertion of an end thereof into a hold of said block in an electrically non-contacting relationship therewith, thereby forming a capacitive connection to the common junction block, said capacitive connections being made to the block for at least each of the comb-line filters having a pass band intermediate of the lowest and highest bands of said spectrum such that each capacitance forms with its associated inductance of the wire connection a resonant circuit having a minimum impedance at a frequency within the pass band of its associated comb-line filter and a high impedance within the pass bands of the other filters.

4,091,345
ELECTROMECHANICAL FILTER HAVING A WIDE TEMPERATURE RANGE

Takeshi Yano; Seiichiro Kanazawa; Takehiro Futami, and Yasuyuki Ishiyama, all of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Aug. 26, 1976, Ser. No. 717,824
Claims priority, application Japan, Aug. 28, 1975, 50-104739
Int. Cl.[2] H03H *9/04, 9/26, 7/38;* H01L *41/10*
U.S. Cl. 333—71 8 Claims

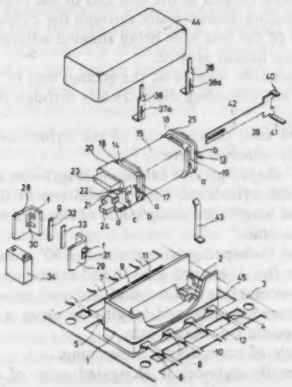


1. In an electromechanical filter comprising a mechanical resonator, an input transducer for converting electric energy to mechanical energy, an output transducer for converting mechanical energy to electric energy, and a pair of external matching circuits electrically connected to the respective transducers, said transducers being mechanically coupled to each other with said resonator interposed, said filter having a predetermined passband including a center frequency, each of said transducers having an equivalent inductance, an equivalent parallel capacitance, and an equivalent series capacitance, each of said matching circuits comprising a coil and a temperature-compensation capacitor connected to form a resonance circuit together with the parallel capacitance of the electrically connected transducer, the improvement wherein the circuit resonant frequencies of each resonance circuit are selected to lie outside of said predetermined passband.

4,091,346
REED RELAY

Hiromi Nishimura; Kenji Ono, and Minoru Shibata, all of Osaka, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan and Hans Sauer, Deisenhofen, Germany

Filed Jun. 11, 1976, Ser. No. 695,192
Claims priority, application Japan, Jun. 11, 1975, 50-71118; Mar. 31, 1976, 51-35730
Int. Cl.[2] H01H *50/04*
U.S. Cl. 335—78 21 Claims



1. A reed type relay comprising an assembly of two, separately constructed, structural elements,

(a) a first of such elements comprising a frame of molded electrically insulating material having a plurality of metallic frame terminals sealingly embedded therein, said frame defining a cavity,

(b) the second of such elements consisting of a relay sub-assembly comprising

(i) an elongated bobbin of molded electrically insulating material,

(ii) a coil wound on such bobbin and having coil terminals on the sub-assembly,

(iii) a pair of magnetic poles mounted at one end of the bobbin,

(iv) a plurality of electrical switch contacts associated with said poles,

(v) a plurality of contact terminals on the subassembly respectively electrically connected to said switch contacts,

(iv) permanent magnet means cooperating with said poles to energise the same magnetically, and

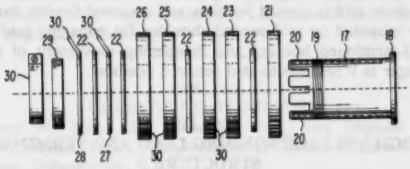
(vii) an elongated reed extending along said bobbin, a base end of said reed being mounted at the other end of the bobbin in a free end of said reed being located between said poles so as to be movable into engagement with said switch contacts upon energisation of the coil,

(c) said relay sub-assembly being mounted in said cavity with electrical contact between said frame terminals, on the one hand, and said coil terminals and contact terminals, on the other hand.

4,091,347
CONVERGENCE APPARATUS FOR IN-LINE BEAMS

Robert Lloyd Barbin, Lancaster, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 17, 1976, Ser. No. 667,834
Int. Cl.[2] H01J *29/68*
U.S. Cl. 335—212 9 Claims



1. A beam convergence apparatus for converging three in-line electron beams of a cathode ray tube, comprising:

first means for producing a non-adjustable magnetic field for moving the two outside ones of said three beams in predetermined directions in relation to the center one of said three beams;

second means for producing an adjustable magnetic field for converging said two outside beams; and

third means for producing an adjustable magnetic field for converging said two converged outside beams onto said center beam.

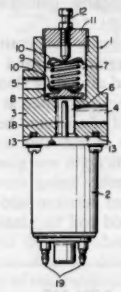
4,091,348
SOLENOID DEVICE FOR ELECTROMAGNETICALLY OPERATED VALVE

Tamio Kawamoto, Sagamihara; Asao Takahashi, and Hiroshi Toyota, both of Yokohama, all of Japan, assignors to Nissan Motor Company, Ltd., Japan

Filed Mar. 8, 1977, Ser. No. 775,531
Claims priority, application Japan, Mar. 12, 1976, 51-29390[U]
Int. Cl.[2] F16K *31/02*
U.S. Cl. 251—129 5 Claims

4. In combination; a valve housing having an inlet and an outlet for fluid flow therethrough, a valve seat in said housing disposed providing communication between said inlet and said outlet, a valve element seated on said seat for closing the valve seat and interrupting communication between said inlet and

said outlet; a solenoid for selectively unseating said valve comprising another housing attached to the valve housing in a fluid-tight manner, an actuating coil selectively energizable disposed internally of the second-mentioned housing, a plunger coaxial with said coil internally thereof mounted for axial movement to a projected position externally of said second housing into and through said valve seat for unseating said valve when said coil is energized, a spring restoring said valve to a seated position and said plunger restoring itself to a retracted position when said coil is denergized, said plunger



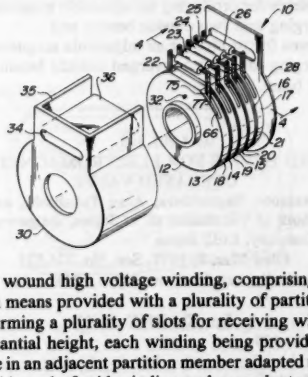
having a push pin of lesser diameter at one end and having an axle shaft of lesser diameter at an opposite end, said push pin defining a first shoulder at a section of intersection with said plunger and said axle shaft defining a second shoulder at a section of intersection with said plunger, a first flexible damper mounted on said first shoulder for engaging said second-mentioned housing and dampening movement of said plunger as it travels to said projected position, and a second flexible dampener mounted on said second shoulder for engaging said second-mentioned housing and dampening movement of said plunger as it restores to said restored position.

4,091,349

HIGH VOLTAGE WINDING LEAD AND TERMINAL STRUCTURE

Wayne M. Niederjohn, Chesapeake, and John R. Underwood, Portsmouth, both of Va., assignors to General Electric Company, Portsmouth, Va.

Filed Dec. 29, 1975, Ser. No. 644,980
Int. Cl.² H01F *15/10*
U.S. Cl. 336—192 **7 Claims**



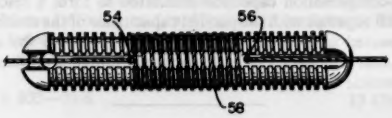
1. A slot wound high voltage winding, comprising:
coil form means provided with a plurality of partition members forming a plurality of slots for receiving windings of a substantial height, each winding being provided with a groove in an adjacent partition member adapted to receive the inside end of said winding and a conductor having a cross-section large in comparison to the diameter of the wire of the winding, said inside end of each of said windings being connected to its respective conductor thereby enabling corona free connection to the inner turn of each winding.

4,091,350

INSULATING CORE FOR USE AS A STRAIN INSULATOR OR A COIL FORM

William E. Buffington, Jr., 1554 Montrose Ave., E., Jacksonville, Fla. 32210

Filed Nov. 29, 1976, Ser. No. 745,821
Int. Cl.² H01F *5/02, 27/30;* H01B *17/24;* G01Q *1/00*
U.S. Cl. 336—208 **6 Claims**



1. An article of manufacture comprising:
A. a generally cylindrical elongated core of electrically insulating material,
B. a plurality of fin segments positioned around a central portion of an outer cylindrical wall of the core and integrally attached thereto, the fin segments being positioned to form a helical groove therebetween running around the core and extending lengthwise from a first end of the central portion to a second end of the central portion,
C. a first hole located at the first end of the central portion and extending diametrically through the cylindrical core, one end of the first hole being situated adjacent to a first end of the helical groove,
D. a second hole located at the second end of the central portion and extending diametrically through the cylindrical core,
E. rounded ends on each end of the cylindrical core and integrally attached thereto,
F. a first U-shaped groove extending lengthwise along a first side of the cylindrical core, around one of the rounded ends, and lengthwise along a side of the core opposite the first side, and
G. a second U-shaped groove positioned 90° around the core from the first U-shaped groove and extending lengthwise along a second side of the cylindrical core, around another of the rounded ends, and lengthwise along a side of the core opposite the second side.

5. An article of manufacture comprising:
A. a generally cylindrical elongated core of electrically insulating material,
B. a plurality of fin segments positioned around a central portion of an outer cylindrical wall of the core and integrally attached thereto, the fin segments being positioned to form a helical groove therebetween running around the core and extending lengthwise from a first end of the central portion to a second end of the central protion,
C. a first hole located at the first end of the central portion

and extending diametrically through the cylindrical core, one end of the first hole being situated adjacent to the first end of the helical groove,

D. a second hole located at the second end of the central portion and extending diametrically through the cylindrical core,

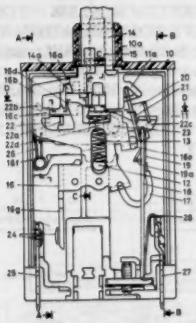
E. a plurality of additional holes at various positions along the central portion of the core extending diametrically through the cylindrical core, and

F. a coil of wire having a first end extending through one of the holes and a second end extending through another of the holes, at least one of the holes through which one of the ends extends being one of the additional holes, a central portion of the coil of wire being wound in a portion of the helical groove formed by the fins.

4,091,351
PUSHBUTTON-OPERATED CIRCUIT BREAKER

Josef Flory, Reussbuhl, and Ernst Kuhn, Lucerne, both of Switzerland, assignors to Weber AG, Fabrik Elektro-Technischer Artikel und Apparate, Emmenbrucke, Switzerland

Filed Nov. 9, 1976, Ser. No. 740,293
Claims priority, application Germany, Nov. 13, 1975, 2551054
Int. Cl.² H01H 71/16
U.S. Cl. 337—62 **8 Claims**



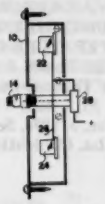
1. In a pushbutton-actuated circuit breaker with a thermal release and an independent trip, comprising a housing, a pushbutton extending through said housing, a contact bridge swivelably and longitudinally displaceably mounted within said housing, said contact bridge being displaceable longitudinally by depression of said pushbutton, spring means for opposing said longitudinal displacement of said contact bridge, latching means for latching said contact bridge after displacement by said pushbutton, allowing said contact bridge to swivel into the "on " position after release of said pushbutton, and holding the said contact bridge in the "on" position, a thermally bendable bimetallic strip associated with said latching means such that, when said contact bridge is latched in the "on" position by said latching means, said latching means releases said contact bridge upon bending of said bimetallic strip, and release means, actuable by said pushbutton, for causing said bimetallic strip to be bent to an extent sufficient to release said latching means, the improvement wherein said release means comprises:

a moveable slide means for causing said bimetallic strip to be bent upon displacement by said pushbutton means, said slide means being operatively connected to said contact bridge such that when said contact bridge is in the "off" position, said slide means is disposed outside the path of travel of said pushbutton and thus cannot be displaced thereby, and when said contact bridge is in the "on" position, said slide means is disposed along the path of travel of said pushbutton and is thus capable of being displaced thereby.

4,091,352
CIRCUIT BREAKER PROTECTED ELECTRICAL RECEPTACLE

Melvin W. Robertson, and William L. Wenzel, both of 18 Cherry Ave., Woodbury Heights, N.J. 08097

Filed Jul. 6, 1976, Ser. No. 702,997
Int. Cl.² H01H 85/02
U.S. Cl. 337—187 **1 Claim**



1. A circuit breaker protected electrical receptacle comprising:

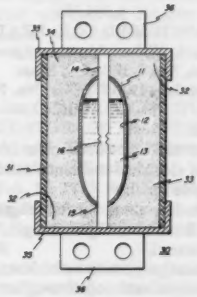
a duplex electrical receptacle including a body member having a pair of spaced apart electrical outlets, each of said outlets including a pair of parallel sockets, said receptacle including means for connecting the same directly to external electrical wiring;

a resettable electromechanical circuit breaker electrically connected to said outlets, said circuit breaker being mounted adjacent the rear of said body member and including an actuator for resetting said circuit breaker, said actuator extending from the rear of said body member into the central portion thereof and being accessible from the front of said body member at a central location between said pair of outlets.

4,091,353
CURRENT LIMITING FUSE

Robert W. Fisk, Cape Elizabeth, Me., and Michael H. McLaughlin, Scotia, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 30, 1977, Ser. No. 782,934
Int. Cl.² H01H 85/02
U.S. Cl. 337—204 **6 Claims**



1. A current limiting fuse comprising an electrically insulating glass member defining a narrow space therein forming an arc constrictor, a dielectric liquid substantially filling the narrow space, the glass member having opposite closed ends, a fuse element immersed in the dielectric liquid, the fuse element extending longitudinally through the member and outwardly through the opposite closed ends, an outer casing having opposite open ends surrounding the member and spaced therefrom defining a plasma cooler space, granular material filling the plasma cooler space and surrounding the member and portions

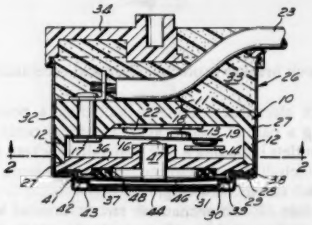
of the fuse element, a pair of metallic end caps with associated electrical terminals, the casing having opposite open ends fitted tightly within the metallic end caps and associated electrical terminals, the casing insulated electrically from at least one of the electrical terminals, and each opposite end of the fuse element in electrical connection with its associated electrical terminal.

4,091,354

BIMETAL SNAP DISC THERMOSTAT ARRANGED TO REDUCE TEMPERATURE CALIBRATION DRIFT

Bernard S. Deubel, and Donald J. Schmitt, both of Mansfield, Ohio, assignors to Therm-O-Disc Incorporated, Mansfield, Ohio

Filed Jun. 3, 1976, Ser. No. 692,591
Int. Cl.² H01H *37/74*
U.S. Cl. 337—343 **7 Claims**



1. A bimetal snap disc thermostat comprising a body assembly, a switch mounted on said body assembly, a steel or the like disc cup mounted on said body assembly and cooperating therewith to define a disc chamber, a seat member positioned within said disc cup providing a disc seat for supporting a bimetal snap disc adjacent its periphery, and a bimetal snap disc seated on said disc seat and connected to operate said switch with snap action upon reaching predetermined operating temperatures, said disc seat being formed of material having a substantially lower modulus of elasticity than the steel of said cup, said disc seat being formed of aluminum and provides a radial portion positioned between and axially located by said disc cup and said body assembly, said radial portion engaging said disc cup over a substantial area.

4,091,355

ANCHORED COIL HEATER

Jacob Howard Beck, Waban, Mass., assignor to BTU Engineering Corporation, North Billerica, Mass.

Filed Jan. 19, 1977, Ser. No. 760,559
Int. Cl.² H01C *3/10*
U.S. Cl. 338—286 **6 Claims**

1. An electrical resistance coil heater comprising:

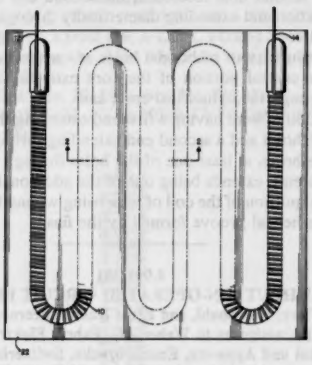
a helical coil of electrical resistance material disposed along a predetermined path;

an anchor extending along the full length of said coil and of electrically insulative, high strength, high thermal conductivity material;

said anchor having a portion embedding a small segment of each coil turn of said coil throughout said path to fully support said coil throughout its length and having a portion outwardly extending from said coil throughout said path, the anchor being of small cross-sectional area not materially affecting the heating performance of the coil;

a support member of electrically insulative, low thermal conductivity, low density material bonded to the outwardly extending portion of said anchor throughout the length of said anchor to provide a low thermal inertia support for said coil which restricts heat flow in the direction opposite to the desired radiation direction;

said coil having a major segment of the coil turns thereof exposed above said support member and unshielded by said support member and anchor for efficient direct radiation from the coil to a product and minimum unwanted heating of the support member; and



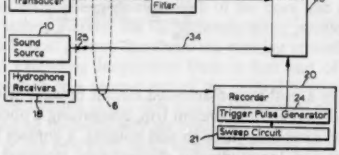
electrical terminal means at each end of said coil for connection of the ends of said coil to an electrical power source.

4,091,356

HEAVE COMPENSATION SYSTEM

Roger Hutchins, Scarborough, Calif., assignor to Hunter (70) Limited, Scarborough, Canada

Filed Dec. 6, 1976, Ser. No. 747,588
Claims priority, application Canada, Nov. 24, 1976, 266505
Int. Cl.² G01V *1/38*
U.S. Cl. 340—3 T **10 Claims**



1. An underwater seismic system for producing sound signals in water and for recording echoes from the bottom beneath the surface of such water, comprising:

(1) a body adapted to travel through said water and including

(a) a sound source for generating a sound signal, said source including input trigger means responsive to a trigger pulse received thereat for generating said sound signal,

(b) a receiver for receiving echoes from said bottom,

(2) a recorder connected to said receiver for recording said echoes, said recorder including repetitive sweep means, and means for generating a first start signal upon commencement of each sweep,

(3) delay means including:

(a) an accelerometer located in said body, said accelerometer including means for generating an output signal indicative of the vertical acceleration of said body,

(b) integration means for double integrating said output signal within a frequency range having a predetermined low frequency rolloff, to produce a position signal approximately indicative of the position of said body for accelerations within said frequency range, said position

signal having a steady state value in the absence of acceleration within said frequency range, said position signal changing in a first sense from said steady state value for upward acceleration of said body and changing in an opposite sense from said steady state value for downward acceleration of said body,

(c) means connected to said recorder for receiving said first start signal from said recorder,

(d) means connected to said integration means for receiving said position signal and also connected to said means (c) and responsive to receipt of said first start signal for thereon generating a second start signal at a time delayed from said first start signal by a time interval which has a predetermined value when said position signal has said steady state value and which decreases from said predetermined value when said position signal changes in said first sense and which increases from said predetermined value when said position signal changes in said opposite sense,

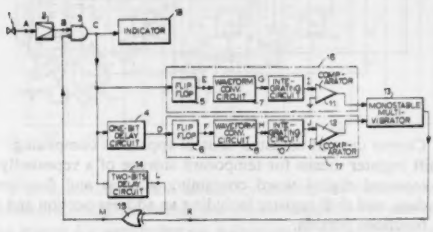
(e) means connecting said means (d) to said input trigger means for said second start signal to constitute said trigger pulse,

so that vertical acceleration of said body within said frequency range will cause compensating variations in the time of operation of said source.

4,091,357
RECEIVING SYSTEM OF TELEMETERING SIGNAL

Masaya Nakajima, Neyagawa, and Katsumi Tabuchi, Kadoma, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jul. 22, 1976, Ser. No. 707,607
Claims priority, application Japan, Nov. 20, 1975, 50/139861
Int. Cl.² H04B *11/00*; G08C *19/26*
U.S. Cl. 340—5 R **9 Claims**



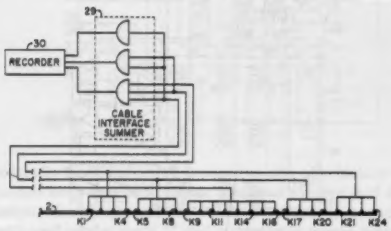
1. A receiving system for a telemeter system using a measuring probe for radiating a sound pulse signal the pulse spacing of which corresponds to information to be measured, said receiving system comprising a one-bit delay means, a pair of integrating means, one of said integrating means being controlled by the sound pulse signal as received so as to carry out an alternate charging and discharging operation and the other of said integrating means being coupled to said one-bit delay means and being controlled by the sound pulse signal delayed by one bit by said one-bit delay so as to carry out an alternate charging and discharging operation, a pulse generating means coupled to said integrating means and said further integrating means for generating a pulse signal having a predetermined time duration when the output signal from said integrating means during the discharging operation arrives at a predetermined level, and a gating means coupled to said pulse generating means which is driven by the pulse signal from said pulse generating means so as to control the receiving operation of said receiving system.

5. A recieving system for a telemeter system using a measuring probe for radiating a sound pulse signal the pulse spacing of which corresponds to information to be measured, said receiving system comprising a pulse generating means for generating timing pulses, a loading means for loading a number of said timing pulses corresponding to the pulse spacing for a certain measurement of each measuring probe, a complement means coupled to said loading means for providing a complement of said loaded number of timing pulses, and a counting means coupled to said complement means for counting a number corresponding to the pulse spacing of the received signal and adding said complement to the counted number.

4,091,358
SEISMIC DETECTING MEANS FOR OBTAINING MAXIMUM SIGNAL ENHANCEMENT

Joseph F. Bayhi, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Continuation-in-part of Ser. No. 350,872, Apr. 13, 1973, abandoned. This application Aug. 9, 1974, Ser. No. 495,947
Int. Cl.² G01V *1/28, 1/16, 1/24*
U.S. Cl. 340—7 R **16 Claims**



1. In a method for delineating subsurface formations for use in seismic exploration of water-covered locations of the earth wherein seismic energy is generated by a seismic source, a portion of the seismic energy is detected by seismic detectors spaced along an elongated cable and comprising at least one seismic array, and the output signals from said seismic detectors are recorded for later seismic analysis, the improvement comprising:

dividing said array into a plurality of detector groups having parallel connected outputs, said array comprised of a central detector group and a plurality of groups located to either side of said central group;

summing the output of selected numbers of detector groups located adjacent the central detector group with the central detector group output; and recording simultaneously the output signal from the central detector group and the summed seismic signal from said central detector group and said selected numbers of detector groups located adjacent the central detector group.

4,091,359
MODULAR LOGIC CIRCUIT UTILIZING CHARGE-STORAGE TRANSISTORS

Bernward Rossler, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Feb. 15, 1977, Ser. No. 768,833
Claims priority, application Germany, Feb. 20, 1976, 2606958
Int. Cl.² H03K *19/08*; G06F *7/38*; H04Q *3/42*
U.S. Cl. 340—166 R **13 Claims**

1. A modular logic circuit, utilizing logic elements formed of reprogrammable charge-storage transistors connected in a matrix array by horizontal and vertical lines, for performing a plurality of different logic functions, said circuit having several input terminals to which input signals are applied whereby a particular logic output signal is obtained at output terminals of the circuit in accordance with said input signals and a previous setting of logic elements, wherein particular logic functions can be set and reset any number of times, comprising:

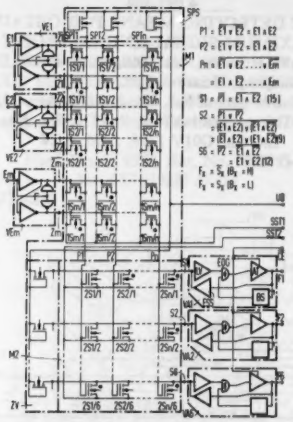
means for applying first setting signals to the input terminals wherein the setting signals, corresponding to a code, consist of separate signal elements;

means for simultaneously applying second setting signals to

the output terminals wherein the setting signals, corresponding to a code, consist of separate signal elements;

a first group of said horizontal lines;

a second group of said horizontal lines, each horizontal line in said second group making up respective output signal paths connected to one of said output terminals;



each of said signal elements of the first setting signals being applied to a separate and distinct one of said horizontal lines in said first group; and,

selector signal means (AS1 . . . AS*p*)for applying said second setting signals to activate at least one of said vertical lines.

4,091,360

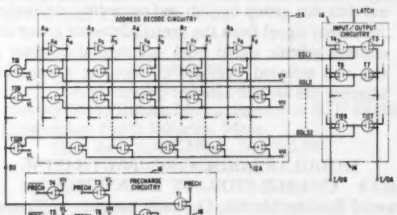
DYNAMIC PRECHARGE CIRCUITRY

William Thomas Lynch, Summit, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sep. 1, 1976, Ser. No. 719,445

Int. Cl.² G11C *7/00*

U.S. Cl. 340—166 R **9 Claims**



1. Circuitry comprising:

first and second switching devices, each device having a control terminal and first and second output terminals;

first and second voltage setting means connected to the control terminal of the first switching device and to a first circuit node;

capacitor means having first and second terminals, the first and second terminals connected to the control terminal and second output terminal of the first switching means, respectively;

the second output terminal of the first switching device connected to the first output terminal of the second switching device means;

third and fourth voltage setting means connected to the control terminal of the second switching device and to a second circuit node;

the combination of the first and second voltage setting means and the first switching device resulting in the first circuit node being characterized by a first charge/discharge time constant;

the combination of the third and fourth voltage setting means and the second switching device resulting in the second circuit node being characterized by a second charge/discharge time constant; and

the first charge/discharge time constant being smaller than the second charge/discharge time constant whereby the first circuit node can discharge from a high voltage level to a low voltage level before the second control terminal can charge from a low voltage level to a high voltage level.

4,091,361

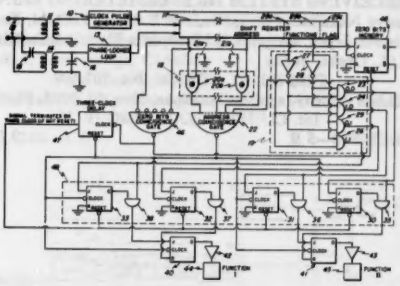
NOISE-IMMUNE CARRIER CURRENT ACTUATED CONTROL

Charles W. Eichelberger, Schenectady, and Philip M. Garratt, Amsterdam, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 9, 1976, Ser. No. 748,932

Int. Cl.² H04Q *9/00*; H04B *1/00*

U.S. Cl. 340—168 R **14 Claims**



1. Carrier current actuated control apparatus comprising:

shift register means for temporary storage of a repeatedly-received digital word containing address and function data, said shift register including an address portion and a functions portion;

intermediate data storage means coupled to the functions portion of said shift register means for transferring the function data to said intermediate data storage means;

switching means coupled to said intermediate data storage means for performing desired operations, and

address detection means responsive to the address portion of said shift register means for actuating said intermediate data storage means to transfer function signals to said switching means.

4,091,362

BIAS STRUCTURE TO EFFICIENTLY PACKAGE A MAGNETIC BUBBLE DOMAIN DEVICE

Thomas T. Chen, Yorba Linda, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Continuation of Ser. No. 587,466, Jun. 16, 1975, abandoned.

This application Oct. 27, 1976, Ser. No. 736,037

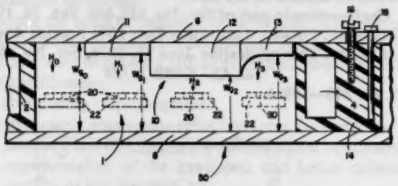
Int. Cl.² G11C *19/08*

U.S. Cl. 365—1 **9 Claims**

1. In a magnetic bias structure including top and bottom bias plates and magnetic end means arranged to form an air gap therebetween, said air gap having length and width and adapted to receive at least one magnetic bubble domain means therein, the improvement comprising:

bias field adjusting means disposed in said air gap to provide

a plurality of uniform local magnetic fields, said bias field adjusting means having a configuration so as to selectively



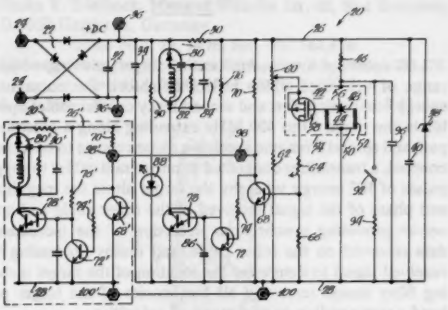
vary the width of said air gap relative to the length thereof to thereby selectively control the local bias field distribution throughout the length of said air gap.

4,091,363

SELF-CONTAINED FIRE DETECTOR WITH INTERCONNECTION CIRCUITRY

Steve L. Siegel, Lisle, and Richard J. Schwarzbach, Naperville, both of Ill., assignors to Pittway Corporation, Northbrook, Ill.

Filed Jan. 3, 1977, Ser. No. 756,493
Int. Cl.[2] G08B *17/10*
U.S. Cl. 340—227 R **13 Claims**



1. In detecting device, means for sensing the occurrence of predetermined phenomena, and means responsive to said sensing means for generating an indication of the occurrence of said phenomena, said means for generating including circuit means for being connected with like circuit means of at least one other detecting device, said circuit means when connected operating said means for generating to provide said indication either upon any one of the devices sensing the occurrence of said phenomena, or upon an improper connection between the circuit means of the devices.

4,091,364

COMBUSTION DETECTION DEVICE

William Webb, Jr., Denver, Colo., assignor to Unitec, Inc., Denver, Colo.

Continuation-in-part of Ser. No. 504,489, Sep. 9, 1974, abandoned. This application Oct. 16, 1975, Ser. No. 623,147
Int. Cl.[2] G08B *21/00*
U.S. Cl. 340—237 S **6 Claims**

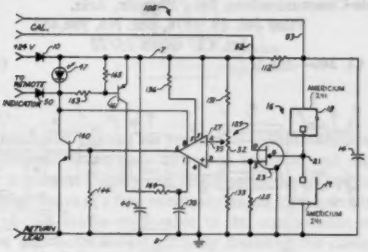
1. A combustion detection apparatus, comprising:

ionization detection means including first and second americium 241 chambers, one of which is open to the atmosphere and the other of which is substantially closed, said chambers being connected so that said ionization detection means provides an output voltage that varies depending upon sensed products of combustion in the atmosphere surrounding said open chamber;

a reference voltage source providing a reference voltage output;

comparator means for receiving said output from said ionization detection means and said reference voltage output, said comparator means having an inhibit input, a drive output and a sink output and providing an output if the output from said ionization detection means exceeds said reference voltage output from said reference voltage source;

trigger means including first and second interconnected



normally nonconductive transistors one of which is connected with said comparator means to receive said drive output therefrom and the other of which is connected with said inhibit input of said comparator means whereby said transistors are caused to become conductive upon receiving an output from said comparator means; and

alarm indicating means connected with said trigger means and, responsive to said transistors becoming conductive, causing and maintaining an alarm indication; and

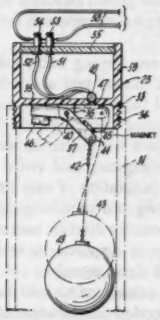
means for receiving said alarm indication from said trigger means and indicating an alarm condition.

4,091,365

SEWER DRAIN ALARM UNIT

Edward L. Allen, 92 Hillside Ave., Hillside, N.J. 07205

Filed Dec. 10, 1976, Ser. No. 749,216
Int. Cl.[2] G08B *21/00*
U.S. Cl. 340—243 **10 Claims**



1. An alarm unit for use in a sewer drain of a dwelling or the like comprising

a solid walled plug having integral male pipe threads thereon adapted for fitting the female threads on an access opening to a low level pipe in said drain,

a pivotal arm attached beneath said solid wall on the side toward said access opening,

a float for sensing a rise in fluid level at said access opening,

means for hanging said float from said arm at a predetermined level relative to said drain pipe with the arm in one pivotal position,

means for biasing said arm toward another pivotal position in the absence of the weight of said float, and

means for actuating an alarm when said arm goes to said other pivotal position comprising

magnetic means attached to said arm, and

proximity switch means actuated by said magnetic means.

4,091,366

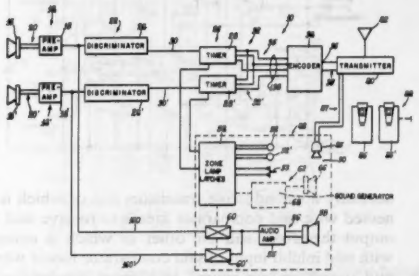
SONIC MONITORING METHOD AND APPARATUS

Thomas F. Lavallee, Phoenix, Ariz., assignor to J.H. McDaniel Tele-Communications, Inc., Phoenix, Ariz.

Filed Jul. 19, 1976, Ser. No. 706,453

Int. Cl.[2] G08B *13/22*

U.S. Cl. 340—258 R 10 Claims



1. A system for monitoring the sound level in a plurality of protected zones for notifying security personnel of the location of a zone in which the sound level exceeds a predetermined value indicative of an alarm condition, comprising:

detector means associated with each of said zones for detecting sound and producing electrical signals proportional to said sound that is detected;

discriminating means operably connected to each of said detector means for receiving said signals and generating an alarm signal in response to said signals exceeding a predetermined level;

timing circuit means connected to said discriminating means for producing predetermined timing signals which identify a zone from which an alarm signal is being generated by said discriminating means in response to receiving said alarm signal;

annunciator means having latch means connected to said timing circuit means, said annunciator means further including visual indicator means, speaker means for reproducing the sound detected by said detector means and switching means connected to said speaker means, said latch means energizing said visual indicator means subsequent to the generation of said timing signals, said latch means operating said switching means so that the switching means normally disables said speaker means and enables the same in response to said timing circuit means receiving said alarm signal;

encoder means connected to said timing circuit means for generating a coded combination of signals identifying the zone from which an alarm signal is being received;

transmitter means connected to said encoder means for modulating said coded combination signals on a carrier signal and transmitting said carrier signal and said coded combination of signals;

one or more receivers, each of which is respectively tuned to receive at least one of said coded combination of signals modulated on said carrier signal and transmitted by said transmitter means, each of said receivers receiving indicator means responsive to said transmitted signal for producing an alerting signal to alert security personnel of the occurrence of an alarm condition.

4,091,367

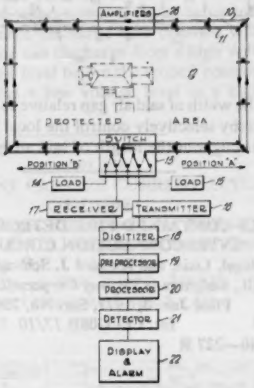
PERIMETER SURVEILLANCE SYSTEM

Robert Keith Harman, 111 Abbyhill, P.O. Box 842, Hazeldean, Ontario, Canada (KOA 2BO)

Continuation-in-part of Ser. No. 552,400, Feb. 24, 1975, abandoned. Foreign Application Data [30] Foreign Application Priority. This application June 15, 1976, Ser. No. 696,225

Int. Cl.[2] G08B *13/24*

U.S. Cl. 340—258 A 9 Claims



1. A detection system for locating targets moving within a range of velocities which reflect or absorb electromagnetic energy comprising, first and second leaky coaxial cables operable in the range 30 to 400 MHz extending along a prescribed path and spaced from one another a distance so as to be loosely coupled, a transmitter connected to one of said cables to supply pulses of RF energy whereby the target alters the magnitude and phase of the signal received at the other cable and a receiver providing synchronous detection of the incremental data received on the other cable, and means processing the received signal to determine the location of the target including filter means removing all frequencies of the target pass band corresponding to said range of velocities.

4,091,368

METHOD AND APPARATUS TO OBTAIN AN ELECTRICAL SIGNAL REPRESENTATIVE OF THICKNESS OF A TRAVELING FILAMENT

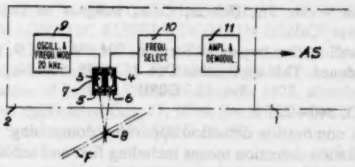
Hermann Schwartz, Pfaffikon, Switzerland, assignor to Siegfried Peyer, Bach, Switzerland

Filed Dec. 1, 1976, Ser. No. 746,520

Claims priority, application Switzerland, Dec. 4, 1975, 15813/75

Int. Cl.[2] G01N *21/48*

U.S. Cl. 340—259 11 Claims



1. Method to obtain an electrical signal representative of the diameter of a traveling filament (F) including the steps of

generating a beam of radiation; passing the filament continuously in a path exposed to the beam; transducing the beam

into an electrical signal; and evaluating the transduced signal

wherein the step of passing the filament in the beam of radiation comprises

directing the beam of radiation to the surface of the filament to irradiate the filament continuously passing in the path of the beam to obtain a diffuse reflection from the surface of the filament;

the transducing step comprises

continuously sensing the reflection from the surface of the filament and deriving a transduced signal continuously representative of the irradiated, and hence reflecting surface of the filament;

and the evaluation step comprises continuously evaluating the instantaneous characteristics of the transduced signal to obtain a continuous signal instantaneously representative of the diameter of the filament (F).

4,091,369

COLLISION-RESPONSIVE ALARM WITH A ROTATING REFLECTOR AND WARNING LIGHT

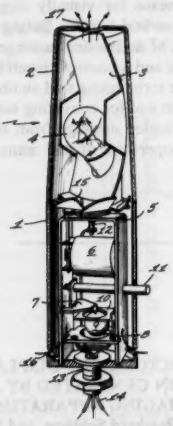
Wilhelm K. Edelbock, Margraf Wilhelm Str. 40, Bad Rotenfels, D 7560 Gaggenau, Germany

Filed Nov. 23, 1976, Ser. No. 744,419

Claims priority, application Austria, Dec. 12, 1975, 9451/75

Int. Cl.[2] B60Q *1/52*; G08B *21/00*

U.S. Cl. 340—262 **5 Claims**



1. A condition-responsive warning light assembly comprising an incandescent lamp,

a rotatable reflector for reflecting light from said lamp, means for rotating said reflector,

impact-responsive switching means for initiating operation of said rotating means in response to a strong impact,

housing means for containing said lamp, reflector, rotating means, and impact-responsive switching means, said housing having a translucent upper portion for allowing the passage of light from said lamp and reflector therethrough and said reflector rotatable with respect to said housing means, and

means providing circulation of air through said housing to cool said lamp, said means comprising air inlet means, air outlet means and means for moving air from said inlet means through said outlet means past said lamp.

4,091,370

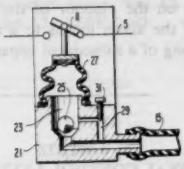
FLUID CONTROL FOR ELECTRICAL CIRCUIT

Franklin J. Swanda, 1107 W. Pine, Rogers, Ark. 72756

Filed Sep. 15, 1976, Ser. No. 723,656

Int. Cl.[2] G08B *21/00, 29/00*

U.S. Cl. 340—272 **5 Claims**



1. A pneumatic control for an electric circuit, comprising a pair of resilient hoses each closed at one end and secured together in parallel side-by-side relationship, means responsive to the compression of a first one of said hoses for controlling an electric circuit, means responsive to the compression of the second of said hoses for temporarily disabling the control of the electric circuit by said first hose, the last named responsive means comprising an expansible chamber that receives air from said second hose and expands to disable said first hose, and air bleed means for discharging air from said expansible chamber at a retarded rate thereby to predetermine the time during which the expanded chamber disables the control of the electric circuit by said first hose.

4,091,371

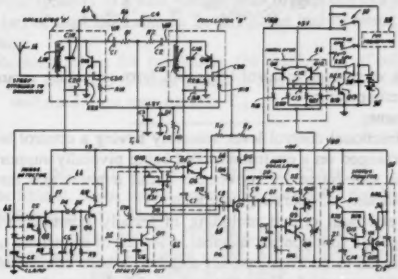
TOUCH-RESPONSIVE PORTABLE INTRUSION ALARM

Stanley I. Mason, Jr., and John E. Pfeifer, both of Weston, Conn., assignors to Simco, Inc., Weston, Conn.

Filed Jul. 28, 1976, Ser. No. 709,316

Int. Cl.[2] G08B *13/26*

U.S. Cl. 340—274 R **5 Claims**



1. A portable intrusion alarm device arranged to be hung from one part of a metallic structure, such as the interior portion of a doorknob apparatus, and to sound an alarm whenever another part of the metallic structure, such as the exterior portion of the doorknob apparatus, is touched by a would-be intruder, comprising:

a housing;

conductive means for supporting the housing from the metallic structure and for making electrical contact with the metallic structure;

said conductive means for supporting the housing comprising a strap formed of interconnected metal strands for hanging the housing from the one part of the metallic structure,

a monitoring circuit within the housing and connected to the conductive means for sensing capacitance changes corre-

sponding to touching of the metallic structure by a would-be intruder;

alarm means within the housing activated upon the sensing of a capacitance change by the monitoring circuit;

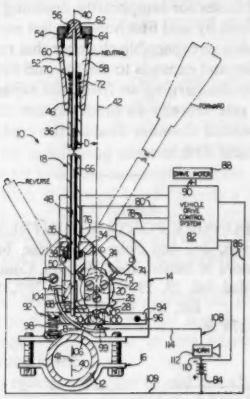
latching means within the housing for maintaining the alarm means in operation after a capacitance coupled to the metallic structure has been removed; and

switch means on the exterior of the housing for causing resetting of the alarm means to a nonactivated state to permit sensing of a subsequent capacitance change.

4,091,372
DIRECTIONAL CONTROL LEVER AND HORN ACTUATING ARRANGEMENT

James G. Blaha, Painesville; John R. Dineen, Maple Heights, and John E. Wible, Painesville, all of Ohio, assignors to Towmotor Corporation, Mentor, Ohio

Filed Jun. 4, 1976, Ser. No. 693,025
Int. Cl.² B60Q *1/26;* H01H *9/06*
U.S. Cl. 340—282 **4 Claims**



1. A directional control lever and horn actuating arrangement comprising:

a frame;

a directional control lever assembly having a control lever arranged on a central axis and being pivotally supported on said frame for movement about a pivot axis into a plurality of operating positions;

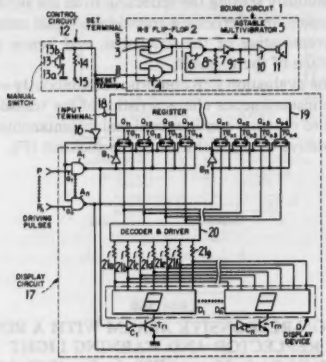
an electrical circuit including in serially communicating order a first contact member, a source of electricity connected to said first contact member, a horn connected to said source of electricity and a second contact member connected to said horn and being spaced from said first contact member and providing an electrically open circuit condition, said circuit being connected to said frame, one of said contact members being arcuately profiled and defining a substantially fixed distance from said pivot axis; and

manually actuated means including a movable element supported by said directional control lever assembly and selectively movable along said central axis between first and second positions for contacting said arcuately profiled contact member, electrically connecting said first and second contact members and selectively actuating said horn, said first position of said movable element maintaining a preselected distance from said arcuately profiled contact member when said control lever is rotated about said pivot axis.

4,091,373
SELECTIVE CALLING RECEIVER

Junpei Nakamura, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Sep. 9, 1976, Ser. No. 721,782
Claims priority, application Japan, Sep. 10, 1975, 50-124662[U]
Int. Cl.² H04M *11/02*
U.S. Cl. 340—311 **6 Claims**



1. A selective calling receiver comprising sound circuit means for generating an audible sound in response to a calling message received from a remote transmitter, a register for receiving and storing a coded message from said transmitter, electronic display means for visually displaying said coded message received from said register, gating means for controlling the transmission of said coded message from said register to said display means and a control circuit including a manual switch and means for terminating said audible sound and resetting said sound circuit and for activating said gating means for transmission of said coded message from said register to said display means upon operation of said manual switch.

4,091,374
METHOD FOR PICTORIALLY DISPLAYING OUTPUT INFORMATION GENERATED BY AN OBJECT IMAGING APPARATUS

Karl-Heinz Müller; Reinhard Schliepe, and Volker Rindfleisch, all of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

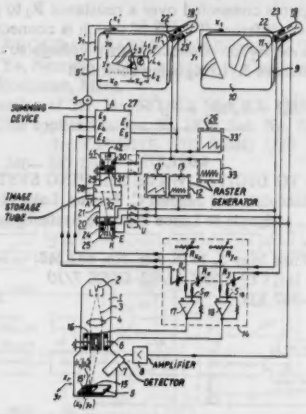
Filed Aug. 31, 1976, Ser. No. 719,112
Claims priority, application Germany, Sep. 3, 1975, 2539677
Int. Cl.² G06K *15/20*
U.S. Cl. 340—324 AD **4 Claims**

1. In a method for pictorially displaying output information generated in the form of an electrical signal by an object imaging electron microscope, said microscope including a first display means for visually displaying a working image of said object and a second display means for visually displaying an orientation image of said object, said orientation image being obtained by varying the operating parameters of said microscope and being displayed simultaneously with said working image, the improvement comprising the steps of

generating the orientation image once,

storing said orientation image in an image storage means,

reproducing said orientation image from said generated image stored in said image storage means, and



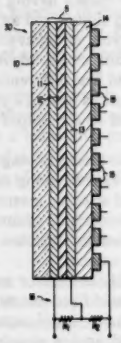
linking said orientation image to said working image by means of a reference marking.

4,091,375

FLAT SCREEN SOLID STATE DISPLAY AND MEMORY DEVICE UTILIZING COLOR CENTERS

Jean Jules Robillard, Ferney Voltaire, France, assignor to Laboratoires de Physicochimie Appliquee, ISSEC S.A., Ferney Voltaire, France

Filed Aug. 23, 1976, Ser. No. 716,460
Int. Cl.[2] G06F 3/14
U.S. Cl. 340—324 R **17 Claims**



1. A flat screen for a solid state passive display system comprising, in order, the following layers:

a transparent support,

a tunnel junction electron injector including

a first metal layer of a metal capable of emitting electrons,

an insulation barrier layer having a thickness through which electrons can pass by tunnel effect, and

a second metal layer having a thickness less than the average mean free path of an electron passing by tunnel effect from the first metal layer through the insulation barrier,

an image screen consisting of a sensitive layer of a chromogenic material capable of generating color centers upon injection of charge carriers, and

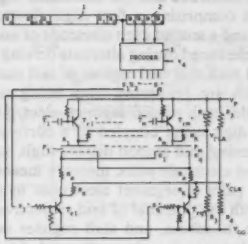
an electrode array for selective formation of color centers in said sensitive layer.

4,091,376

DRIVING CIRCUITS FOR A MULTI-DIGIT GAS DISCHARGE PANEL

Koji Maekawa, Yamatokoriyama, and Iwao Hamasaki, Miyazaki, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Aug. 6, 1976, Ser. No. 712,043
Claims priority, application Japan, Aug. 13, 1975, 50/98700
Int. Cl.[2] G09F 9/00
U.S. Cl. 340—336 **3 Claims**



1. In combination with a driving circuit for energizing a display means to display m-digit numerical or alpha-numerical symbols thereon in accordance with information contained within an n-digit storage means wherein $m<n$ and wherein during a succession of digit time periods T_1 to T_n inclusive of one or more dead time periods T_{m+1} to T_n when no display of information is desired, said display panel including a gas-filled segmented discharge panel with a plurality (m) of display units each having an anode terminal and a plurality (q) of segmented cathode terminals, decoder means for transferring information from said storage means to said discharge panel, a plurality (m) of semiconductor switching means coupling said decoder means to the respective anodes and a plurality (q) of semiconductor switching means coupling said decoder means to the respective cathodes, said semiconductor switching means controlling the display of the m-digit numerical or alphanumerical symbols on a time-sharing basis in response to a plurality (m) of digit time signals T_1 to T_m, the improvement comprising:

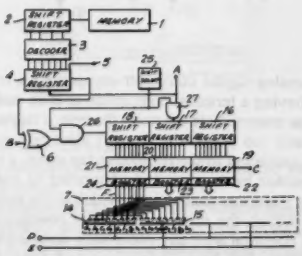
blocking means for precluding the application of information from said decoder means to said display panel during said dead digit time periods T_{m+1} to T_n.

4,091,377

DIGITAL DISPLAY DRIVING CIRCUIT

Akio Shimoi, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Apr. 23, 1976, Ser. No. 679,533
Claims priority, application Japan, Apr. 23, 1975, 50-49289
Int. Cl.[2] G09F 9/32; G02F 1/13
U.S. Cl. 340—336 **7 Claims**



1. In a display having first and second display digits, said first

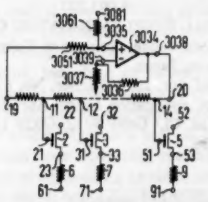
display digit and said second display digit being respectively formed by a plurality of segment electrodes, at least one digit electrode spaced apart from said segment electrodes and material disposed between said segment electrodes and said digit electrode, said material being of a type in which regions thereof are rendered visually distinguishable from adjacent regions by the application of an electric field across said region, regions of said material in registration with a segment electrode being rendered visually distinguishable in response to a predetermined potential difference being applied across that segment electrode and the associated digit electrode, the improvement comprising a first digit electrode of said first display digit and a second digit electrode of said second display digit being referenced during alternate driving intervals of time to a potential such that said regions of said material in registration therewith are prevented from being rendered visually distinguishable, each of said segment electrodes, forming said first display digit being coupled to a corresponding segment electrode forming said second display digit, to define a plurality of segment electrode pairs, memory means for referencing each of said pairs of segment electrodes to a potential to be compared with the potential of said respective digit electrodes spaced apart therefrom, and shift register means adapted to receive a drive signal and supply said drive signal to said memory means prior to each driving interval of time, including drive circuitry processing means for producing a word signal, a digit select means intermediate said processing means and said shift register means for gating said word signal to said shift register means, each said word signal containing at least a first series digit driving signal and a second series digit driving signal, and alternating current drive means disposed intermediate said digit select means and said word signal processing means for inverting said word signal after every predetermined number of drive intervals of time, to thereby alternately reverse the polarity of the predetermined potential differences applied across any one of the respective spaced apart segment electrodes and spaced apart digit electrodes to extend the life of said visually distinguishable material.

4,091,378

ARRANGEMENT, IN PARTICULAR AN ANALOG-DIGITAL/DIGITAL-ANALOG CONVERTER AND METHOD OF OPERATION THEREOF

Kurt Hoffmann, Taufkirchen, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sep. 11, 1975, Ser. No. 612,570
Claims priority, application Germany, Sep. 20, 1974, 2445142
Int. Cl.² H03K *13/02*
U.S. Cl. 340—347 AD **1 Claim**



1. An analog-digital converter comprising a resistance line or chain having a terminal connection at each end thereof and at least one intermediate tap point thereon, a respective transistor for each tap point, the control electrode connection of which is connected to the respective tap point, a resistance for each transistor having one end connected to one of the two remaining transistor connections, which at the same time forms a digital output, the other end of such resistance being connected in common with any other such resistance, the ends of the resistance line being interconnected over a differential amplifier, one terminal connection of the resistance line being connected over a resistance R_1 to the positive differential input of the amplifier, the output of the amplifier being connected to the other terminal connection of the resistance line, and over a resistance R_4 with the negative differential input of the amplifier, which input is connected over a resistance R_3 to ground, and the positive differential input of which is connected to a further resistance R_2 for connection to a voltage source, the values of resistances R_1 to R_4 being such that

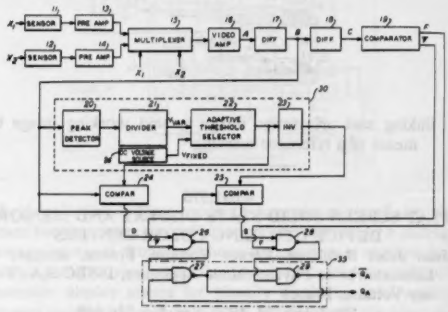
$$R_3/(R_3 + R_4) = R_1/(R_1 + R_2) = \tfrac{1}{2}.$$

4,091,379

ANALOG TO DIGITAL WAVE SHAPING SYSTEM

Paul S. Wu, Randolph, and Jagdish C. Tandon, Lake Hiawatha, both of N.J., assignors to Litton Business Systems, Inc., Pine Brook, N.J.

Filed May 3, 1976, Ser. No. 682,245
Int. Cl.² H03K *13/02*; G06K *7/10*
U.S. Cl. 340—347 AD **3 Claims**



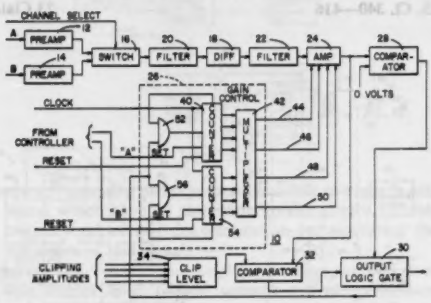
1. An analog to digital wave shaping system comprising:
a source of analog signals;
first differentiator means having an input coupled to said source of analog signals and an output;
inverter means having an input and an output;
second differentiator means having an input connected to the output of said first differentiator means and an output;
first comparator means having a pair of outputs, and having an input coupled to the output of said second differentiator;
second comparator means having an input and an output;
third comparator means having an input and an output;
adaptive threshold selector means having an input coupled to said first differentiator means input, and an output;
said adaptive threshold selector means including a fixed intensity signal source;
said adaptive threshold selector means output being equal to the intensity of said fixed intensity signal source whenever said fixed intensity signal source intensity exceeds the intensity of said analog signals and being equal to the intensity of said analog signals whenever said fixed intensity signal source intensity is less than the intensity of said analog signals;
said adaptive threshold selector means output being coupled to said second comparator means input and to said inverter means input;
the output of said inverter means being coupled to an input of said third comparator means;
the output of said first differentiator means being coupled to an input of said second comparator means and to an input of said third comparator means;
first and second gate means; and
flip-flop means;
a first output of said first comparator and said second comparator output and a second output of said first comparator and said third comparator output being coupled to said first and second gate means, respectively;

said first and second gate means each having an output coupled to said flip-flop means.

4,091,380
PROGRAMMABLE BINARY AMPLIFIER

Chin C. Yu, Norristown, Pa., assignor to Computer Peripherals, Inc., Rochester, Mich.

Continuation of Ser. No. 557,632, Mar. 12, 1975, abandoned. This application Sep. 30, 1976, Ser. No. 728,356
Int. Cl.[2] G11B 5/02; H03G 3/30
U.S. Cl. 340—347 DD 16 Claims



1. In a data decoding system for decoding data signals read from magnetic tape, the magnetic tape including first reference signals recorded thereon at the beginning of the tape, the improvement comprising:

amplifier means for receiving said first reference signals and said data signals read from the tape for amplifying said signals, said amplifier means including a plurality of stages of amplification for amplifying said signals, each stage having a gain of either one or A^n where A is a number greater than one and where n is an integer equal to or greater than zero and selected to form a binary progression, said stages having an output signal whose gain is equal to the product of a gain of each stage of amplification;

a plurality of switches corresponding in number to the number of stages of amplification with each of said switches being associated with a respective stage of amplification and coupled to each of said amplifier stages for incrementally changing the gain of each stage from one to A^n when operated;

a binary counter operated by said first reference signals to incrementally output a predetermined number of increasing binary numbers;

decoding means coupled to said switches and said binary counter for receiving the binary output of said counter to operate said switches in accordance with the binary output of said counter wherein the amplifier gain is sequentially incremented through a number of increments corresponding to said predetermined number counted by said counter;

a source of second reference signals representing a voltage level of a predetermined magnitude greater than zero;

first means for comparing the output of the amplifier to a referece voltage equal to zero and having an output when the amplitude of the amplifier signal exceeds said reference voltage;

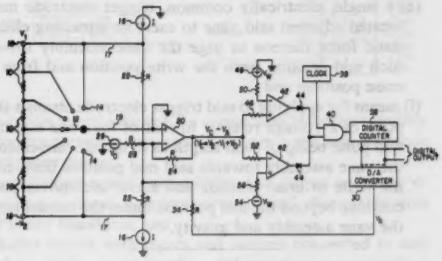
second means for comparing the output of the amplifier to said second reference signals and having an output when the amplified signal exceeds said second reference signals;

and means coupling the output of said second comparing means to said binary counter for inhibiting the incrementing of said counter whereby the gain of the amplifier is set at a level equal to the output of the binary counter.

4,091,381
DIGITAL INDICATION FOR SELECTABLE IMPEDANCE CIRCUIT

Dean P. Huntsinger, Marion, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jul. 2, 1976, Ser. No. 702,372
Int. Cl.[2] H03K 13/03
U.S. Cl. 340—347 AD 13 Claims



1. A digital indicating method for a selectable impedance circuit consisting of a plurality of serially connected impedances and a selector for selectably connecting to a common terminal the junction of any of the impedances, comprising:

passing like electric currents between the common terminal and each end terminal of the circuit;

subtractively combining the signals developed between the common terminal and the two respective end terminals of the circuit;

generating a series of clock pulses;

digitally counting said clock pulses in the presence of an enable signal;

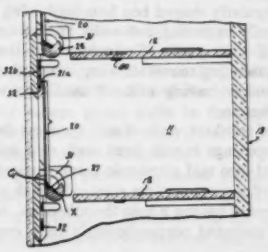
converting the digital count to an analog equivalent signal, and

comparing said analog equivalent signal to said subtractively combined signal and generating said enable signal when they differ by more than a predetermined amount.

4,091,382
DISPLAY SYSTEM

Andrew G. Anderson; William D. Greason, and Anantaraman R. Prasan, all of London, Canada, assignors to Willis J. Ball, London, Canada

Filed Sep. 27, 1976, Ser. No. 726,747
Int. Cl.[2] G08B 5/00
U.S. Cl. 340—373 12 Claims



1. A display unit comprising

(a) a vane assembly comprising a thin metallic vane and a mount therefor;

(b) means supporting said mount for pivotally supporting the vane assembly about a horizontal axis between a write position in which the vane is substantially vertical and an erase position in which the vane is substantially horizontal;

(c) stops defining said positions;

(d) the vane assembly having a centre of gravity located on one side of said axis in the write position to retain the vane assembly in such write position by gravity and located on the other side of said axis in the erase position to retain the vane assembly in such erase position by gravity, said centre of gravity being located to move between said sides of the axis at a mid position of the vane assembly between said write and erase positions;

(e) a single, electrically common, trigger electrode means located adjacent said vane to exert an attracting electrostatic force thereon to urge the vane assembly towards such mid position from the write position and from the erase position; and

(f) means for applying to said trigger electrode means a short pulse of a voltage relative to that of the vane assembly, said pulse being of such length as to initiate movement of the vane assembly towards said mid position from either the write or erase position and allow said movement to continue beyond the mid position under the momentum of the vane assembly and gravity.

4,091,383

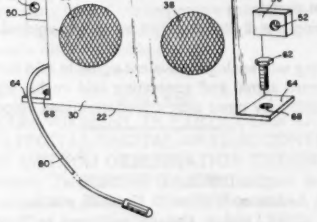
GAME SAVER DEVICE

Frederick Rainville, R.D. #1, Argyle, N.Y. 12809

Filed May 5, 1977, Ser. No. 794,037

Int. Cl.[2] G08B *3/00*

U.S. Cl. 340—384 R **1 Claim**



1. An improved game saver device adapted to be mounted on a front grill of an automobile, said device including a conventional ultrasonic wave generating system for producing an ultrasonic signal to scare an animal, which comprises:

(a) a rectangularly shaped box housing having a base, a pair of upwardly extending end walls, an upwardly extending front wall with a pair of openings therethrough, an upwardly extending rear wall, a top, and a chamber therein, said chamber having said ultrasonic wave generating system therein;

(b) a pair of speakers, each of said speakers disposed in one of said openings in said front wall, said pair of speakers integrated into said ultrasonic wave generating system;

(c) a pair of mounting plate elements, each said mounting plate element having a hole therethrough, each said plate element mounted perpendicularly onto one of said end walls;

(d) a pair of plate members, each plate member having a hole therethrough, one of said plate members extending linearly outwardly from each end of said base of said housing;

(e) an elongated bar member having a pair of transverse end apertures therethrough, said bar member disposed behind said grill of said automobile;

(f) a pair of hooked shaped clamps, one end of each said clamp having a hole therethrough, another end of each said clamps hooking under a front end of a frame of said automobile; and

(g) a plurality of bolt members for securing each said plate element to said bar member and each said plate member to one said end of each said clamp.

4,091,384

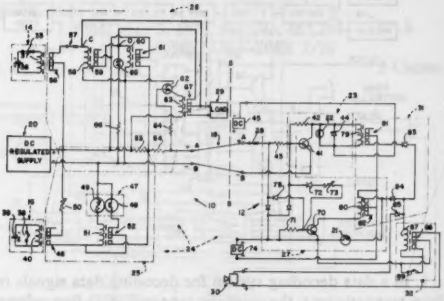
MONITORING ALARM SYSTEM

Donald C. Green, Jr., Whitehouse, Tex., assignor to Donald C. Green, Sr., Tyler, Tex., a part interest

Filed Aug. 17, 1976, Ser. No. 715,204

Int. Cl.[2] G08B *13/22*

U.S. Cl. 340—416 **23 Claims**



1. An alarm system comprising:

a first station in a site to be monitored;

a second station in a site to monitor said first station;

a first alarm control means in said first station;

a second alarm control means in said first station;

phone lines inter-connecting said first station and said second station, and adapted to be connected to a source of DC electric power for applying a voltage thereto;

a first-indicating means in said second station for indicating a first alarm condition by a first mode of operation thereof, and for indicating a second alarm condition by a second mode of operation thereof;

a second-indicating means in said second station for indicating at least a third alarm condition by a mode of operation thereof;

first-circuit means operatively connected to said phone lines for effecting energization of said second-indicating means should the voltage of said phone lines be lost; and

second circuit means operatively connected to said phone lines for effecting operation of said first-indicating means in said first mode in response to actuation of said first alarm control means, and for effecting operation of said first-indicating means in said second mode in response to actuation of said second alarm control means.

4,091,385

DOPPLER RADAR FLOWMETER

Walter J. Petlevich, Uniontown, and Edward F. Sverdrup, Adamsburg, both of Pa., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Nov. 24, 1976, Ser. No. 744,495

Int. Cl.[2] G01S *9/44*

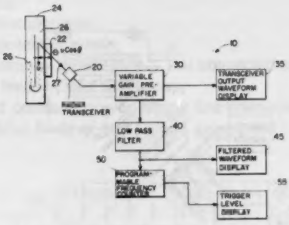
U.S. Cl. 343—8 **5 Claims**

1. A Doppler radar flowmeter for measuring the velocity of flow of particulate matter carried by a fluid within a conduit comprising:

transceiver means for radiating radio waves at a predetermined microwave frequency through a microwave window in said conduit and at least partially through said fluid, and for receiving at least a portion of said radio

waves back-scattered by at least a portion of said particulate matter in the path of said radiated radio waves;

means connected to said transceiver means including a variable gain amplifying means for producing a signal of variable amplitude related to the Doppler shift in frequency between said back-scattered radio waves and said radiated radio waves, and thus related to the velocity of flow of the particulate matter;



frequency counting means responsive solely to peaks in said signal which have an amplitude greater than a variable trigger level of said counter means, for measuring the frequency of said signal;

wherein said variable gain amplifying means and said variable trigger level of said counter provide calibration means for said flowmeter.

4,091,386

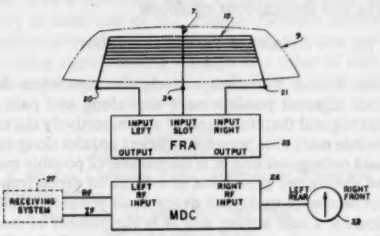
REAR WINDOW DIRECTION FINDING ANTENNA

Arthur Luedtke, Marietta, and William Ferrel Bentley, Smyrna, both of Ga., assignors to Field Operations Bureau of the Federal Communications Commission, Washington, D.C.

Continuation-in-part of Ser. No. 610,708, Sep. 10, 1975, Pat. No. 4,003,057. This application Jun. 2, 1977, Ser. No. 802,845

Int. Cl.[2] H01Q *1/32*

U.S. Cl. 343—713 **10 Claims**



1. A rear window DF antenna mounted on a window of a vehicle having a split ground plane comprising two parallel vertical wire spaced whip elements means spaced apart connected by a plurality of parallel horizontal wire delay line means, and a center vertical wire slot coupling means, insulated from the parallel horizontal wires.

4,091,387

BEAM FORMING NETWORK

Charles Edward Profera, Cherry Hill, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 5, 1977, Ser. No. 794,129

Int. Cl.[2] H01Q *19/06, 3/26*

U.S. Cl. 343—754 **6 Claims**

1. A network for providing excitation in a desired pattern to a plurality of radiators of an antenna in response to an output from a transmitter, comprising:

waveguide means for combining a field that has a known direction and an H_{10} mode of propagation with a field that has said known direction and an H_{12} mode of propagation, said propagations being from an input end to an output end of said waveguide means, thereby providing a composite field at said output end that has amplitudes that are a representation of amplitudes of a discrete inverse Fourier transform of said desired pattern;

excitation means adapted for connection to said transmitter for concurrently causing said H_{10} mode and said H_{12} mode of propagation;

phase shifting means connected to said output end for providing a signal representation of said discrete inverse Fourier transform; and

a Butler matrix with inputs and outputs connected to said phase shifting means and to said radiators, respectively.

4,091,388

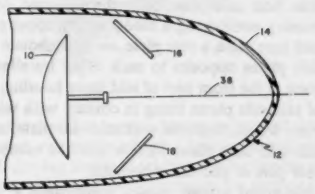
BORESIGHT ERROR COMPENSATION IN BORESIGHTING ANTENNA-RADOME SYSTEM

Thomas Edward Fiscus, San Diego, Calif., assignor to General Dynamics Corporation Electronics Division, San Diego, Calif.

Filed Dec. 8, 1976, Ser. No. 748,662

Int. Cl.[2] H01Q *19/06, 1/42*

U.S. Cl. 343—872 **2 Claims**



1. A boresighting antenna-radome system, comprising:

a boresighting antenna for receiving signals within a given frequency band; and

a radome covering the antenna and the space forward of the antenna in the direction from which said signals are received, wherein the radome has a longitudinal axis and symmetry and a wall which includes dielectric material and thereby causes phase shifts in the received signal passing through the radome wall;

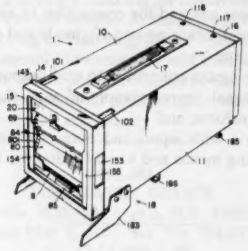
wherein the improvement comprises:

one or more pairs of perforated metal plates, each plate having a dielectric thereon, the plates of each pair being positioned symmetrically in relation to the radome axis, forward of the antenna in the radome, and tilted forward toward the radome axis from the interior wall of the radome such that the forward-most edge of each plate is nearest the axis of the radome at such an angle as to provide a phase lag in frequency components of the received signal at the high end of the given frequency band and a phase lead in frequency components of the received signal at the low end of the given frequency band, so as to compensate for the phase shifts caused by passage of the received signal through the radome wall.

4,091,389
SELF-BALANCING RECORDER

Hisaya Fujita; Nobuo Kaieda, and Setsuo Sato, all of Musashino, Japan, assignors to Yokogawa Electric Works, Ltd., Tokyo, Japan

Filed Feb. 10, 1977, Ser. No. 767,517
Claims priority, application Japan, Mar. 31, 1976, 51-35647
Int. Cl.[2] G01D 9/00, 15/00
U.S. Cl. 346—32 11 Claims



1. A self-balancing recorder comprising:

(a) an outer housing comprising a box-like main body and a door installed at the front of the main body;

(b) an inner housing readily mountable into and dismountable from said main body through said door, said inner housing comprising: a base plate, an upper plate parallel to said base plate, a rear plate, an intermediate plate, and two side plates opposite to each other installed on said base plate in the front part of said inner housing; the rear edges of said side plates being in contact with said intermediate plate which, together with said rear plate, said upper plate and said base plate, form a box-like compartment in the rear part of said inner housing;

(c) electrical circuit means comprising a printed circuit board vertically installed in approximately the center of the space formed between said upper plate and said base plate, the printed circuit board thus providing two spaces on both sides;

(d) a torque transmission mechanism comprising a mounting plate fastened to said intermediate plate, a main frame installed on one side of said mounting plate and equipped with a group of gears, and a synchronous motor installed on the other side of said mounting plate and having its output shaft coupled to said group of gears;

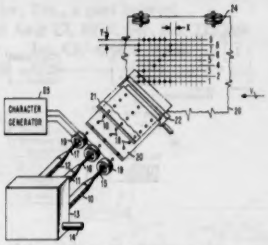
(e) a recording element associated with a scale and a pointer facing the scale, a string threaded on a pulley mechanism and driven by a servo-motor, a slide resistor, and a shaft installed across said side plates, said recording element being slidably moved by said string, together with the moving part of said slide resistor, on said shaft; and

(f) a recording chart feed mechanism comprising a box including a first compartment for accommodating an unused recording chart, a second compartment for storing a recorded part of the recording chart, and a sprocket driven by torque from said torque transmission mechanism for feeding the recording chart from the said first compartment through the said recording element and into the said second compartment.

4,091,390
ARRANGEMENT FOR MULTI-ORIFICE INK JET PRINT HEAD

Normand Coy Smith, and Joseph Townsend Wilson, III, both of Endicott, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 20, 1976, Ser. No. 752,773
Int. Cl.[2] G01D 15/18
U.S. Cl. 346—75 7 Claims



1. Recording apparatus comprising:

a plurality of nozzle means arranged in a row and issuing parallel streams of drops toward a recording member;

means including a pair of electrodes parallel to said row for establishing a transverse electrostatic field between said nozzle row and said recording member;

individual means for each nozzle means for selectively inducing any of different predetermined electrical charges in each of the drops issuing therefrom whereby the charged drops from each nozzle are deflected by said field to any of a plurality of levels for deposition in any of a plurality of mark sites on said member according to the charges carried thereby; and

means for producing relative motion between said nozzle row and said member along a path inclined with respect to the longitudinal axis of said row at an angle θ defined by the two simultaneous equations:

$$\text{Tan } \theta = LY/MX \text{ and Tan } \theta = (N \pm K)X/NY$$

wherein X and Y are respectively the separation distances between adjacent possible mark sites along said path and an axis orthogonal thereto; L and M are respectively the numbers of possible mark sites between adjacent nozzles along said path and said orthogonal axis; K is the number of possible mark sites passed during the generation of a series of drops from a said nozzle necessary to deposit drops at all possible levels of deflection for a said nozzle; and N is the number of mark sites possible to mark with said drop series, said L, M, K and N being integers and the sign of K being dependent on the direction of motion along said path.

4,091,391
DRIVE SYSTEM FOR THERMAL RECORDING APPARATUS

Yasuyuki Kozima, Hitachi; Kiyohiko Tanno, Katsuta, and Ichiro Ishi, Yokohama, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Mar. 29, 1977, Ser. No. 782,377
Claims priority, application Japan, Apr. 2, 1976, 51-35960
Int. Cl.[2] G01D 15/10; H05B 3/00
U.S. Cl. 346—76 R 10 Claims

1. A drive system for a thermal recording apparatus, comprising:

recording signal input means;

a thermal resistor assembly including a plurality of thermal resistor elements connected in series;

a plurality of drive leads taken out of the opposite outer ends of said thermal resistor assembly and a plurality of junc-

tion points between adjacent ones of said thermal resistor elements, said plurality of drive leads being divided to belong alternately to a first and a second set of drive leads, said drive leads of said second set of drive leads being divided to belong alternately to a first and a second group;

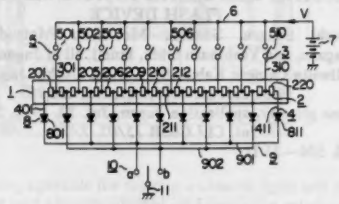
first connector means for selectively connecting at least one of said drive leads of said first set of drive leads to said recording signal input means in accordance with a given pattern;

first potential means;

second potential means;

a first common power supply line connected to each of said drive leads of said first group;

a second common power supply line connected to each of said drive leads of said second group; and



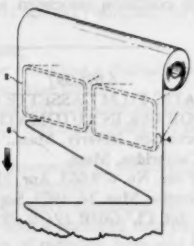
second connector means for selecting one of said first and second groups in accordance with a given pattern, said second connector means connecting one of said first and second common power supply lines associated with said selected one of said first and second groups to said first potential means, said second connector means connecting the other of said first and second common power supply lines associated with the other of said first and second blocks to said second potential means, whereby said one of said first and second common power supply lines is supplied with a recording signal thereby to actuate operatively at least one of said resistor elements selected in accordance with said predetermined pattern, and the recording signal flowing through said other of said first and second common power supply lines is suppressed.

4,091,392

SKEW CORRECTION

Donald E. Shafer, Littleton, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 23, 1976, Ser. No. 753,716
Int. Cl.[2] G01D *9/04*
U.S. Cl. 346—110 R **5 Claims**



1. A two channel cathode ray tube recording system for recording a wide contiguous trace record on a moving record receiving member, said system comprising

a first channel cathode ray tube,

a second channel cathode ray tube,

a first skew correction means for producing a skew correction signal for said first channel cathode ray tube,

a second skew correction means for producing a skew correction signal for said second channel cathode ray tube, and

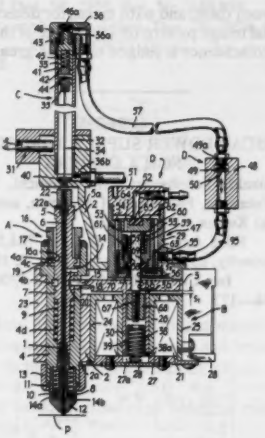
means interconnecting said first and second skew correction means for offsetting said skew correction signal for said second channel by an amount determined from a selected value of said skew correction signal for said first channel.

4,091,393

AUTOMATIC PENCIL APPARATUS FOR AN AUTOMATED DRAFTING SYSTEM

Masami Masuyama, and Tsukasa Edo, both of Narashino, Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan

Filed Jun. 24, 1976, Ser. No. 699,356
Claims priority, application Japan, Jun. 24, 1975, 50-77849
Int. Cl.[2] G01D *15/24*
U.S. Cl. 346—139 C **32 Claims**



1. An automatic pencil apparatus for an automated drafting system comprising, releasable gripping means for gripping or releasing a lead, driving means for driving said gripping mechanism to different positions, pressing means for applying constant pressure to the pencil lead to press the pencil lead in use against a drafting sheet with a constant pressure, and change-over means for supplying the constant pressure to and removing the constant pressure from said pressing means in response to the vertical movement of said gripper, wherein said change-over means includes means for removing the constant pressure at a controlled rate to gently release the pencil lead.

4,091,394

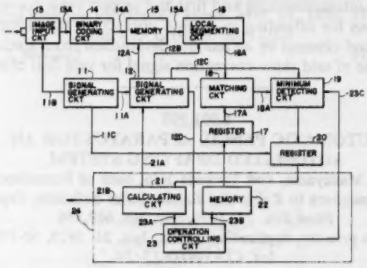
PATTERN POSITION DETECTING SYSTEM

Seiji Kashioka, Hachioji; Masakazu Ejiri, Tokorozawa; Michihiro Mese; Takafumi Miyatake, both of Hachioji; Toshimitsu Hamada, Tokyo, and Isamu Yamazaki, Tachikawa, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 26, 1977, Ser. No. 762,717
Claims priority, application Japan, Jan. 26, 1976, 51-6671
Int. Cl.[2] G06K *9/04*
U.S. Cl. 340—146.3 H **7 Claims**

1. A pattern position detecting system comprising image input means to generate a video signal by means of a scanning of an image, first means to selectively designate one of a plurality of desired sampling periods, second means to generate sampling pulses having the sampling period designated by said first means, third means to extract a partial image pattern sampled by said sampling pulses from the video signal gener-

ated by said image input means, fourth means for storing standard patterns, fifth means to compare one of the standard patterns from said fourth means and said partial image pattern from said third means and to evaluate the degree of coinci-



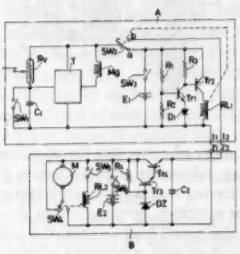
dence between them, and sixth means for detecting the position of the partial image pattern on said image at the time when the degree of coincidence is judged to be the greatest by said fifth means.

4,091,395

ELECTRICAL POWER SUPPLY TRANSFER SYSTEM FOR A CAMERA

Susumu Kozuki, Yokohama; Akio Sunouchi, Tokyo, and Yoshiaki Watanabe, Fujisawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 4, 1977, Ser. No. 784,523
Claims priority, application Japan, Apr. 8, 1976, 51/39631
Int. Cl.[2] G03B *1/18;* H02J *7/00*
U.S. Cl. 354—173 **10 Claims**



1. An electrical power source changeover system of an automatic exposure control camera provided with an accessory unit comprising;

* an accessory unit
said unit including:
(a) first power supply means; and
(b) an electrical circuit which is to be rendered operative by power supply from said first power supply means;

* a camera body
said camera body including:
(c) second power supply means;
(d) exposure control means which is to be rendered operative by power supply from said second power supply means;
(e) detecting means for detecting whether or not the power supply voltage of said second power supply means is above a predetermined level at which said exposure control means is operable; and
(f) changeover means positioned between said second power supply means and exposure control means, said means being switchable between a first position where, based on the detected result of said detecting means, said exposure control means is brought into connection with said second power supply means, and a second position where said exposure control means is taken out of the connection with said second power supply means; and

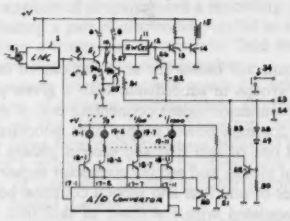
* means for electrically connecting said accessory unit with said camera body,
said means connecting said first power supply means to the second position of said changeover means so that when said changeover means is moved to the second position, the power supply voltage of the first power supply means is applied to said exposure control circuit.

4,091,396

CAMERA EXPOSURE CONTROL AND INDICATING CIRCUITRY RESPONSIVE TO A SIGNAL FROM A FLASH DEVICE

Masayoshi Sahara, Sennan; Motonobu Matsuda, Kawachinagano, and Yoshiharu Ohta, Izumi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jul. 25, 1977, Ser. No. 818,963
Claims priority, application Japan, Jul. 30, 1976, 51-91700
Int. Cl.[2] G03B *15/05, 7/08*
U.S. Cl. 354—23 D **19 Claims**



1. In a photographic camera, the combination comprising:
automatic exposure control circuitry;
indicating means for indicating at least one exposure condition;
an electronic flash device including a main capacitor and flash means energized thereby, and means for generating a multilevel signal having an amplitude varying between predetermined upper and lower levels with said main capacitor in a charged condition;
first means responsive to said multilevel signal for setting said exposure control circuit to a proper condition for flash photography; and
second means responsive to the upper level of said multilevel signal for energizing said indicating means to indicate a photographic condition associated with flash photography.

4,091,397

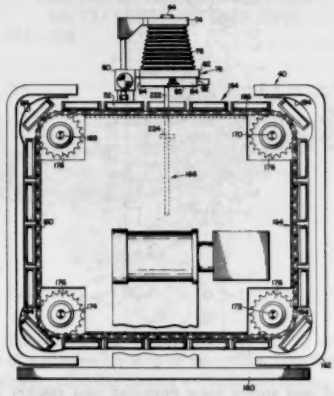
AUTOMATIC FILM CASSETTE CHANGING APPARATUS FOR USE IN AUTOMATIC PHOTOSTUDIO

Richard E. Gulbrandsen, Beverly, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation of Ser. No. 679,053, Apr. 21, 1976, abandoned.
This application Mar. 14, 1977, Ser. No. 777,512
Int. Cl.[2] G03B *19/10, 29/00*
U.S. Cl. 354—81 **7 Claims**

6. Photographic apparatus for use with an automatic photostudio of the type having a self-developing camera therein which includes locating means for locating a cassette holding self-developing film units in operative relation with the camera, said apparatus comprising:
a closed loop conveyor having a train of trays thereon, each said tray being configured to hold one film cassette, said

conveyor being operative to move said train of trays along a closed loop path to sequentially present each of said trays at an aligned position below the cassette locating means of the camera; and



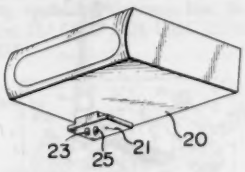
means being operable for moving a cassette from one of said trays at said aligned position into operative relation with the locating means of the camera and, after the film units in the cassette have been expended, for moving the empty cassette back to said one tray at said aligned position.

4,091,398

ELECTRONIC PHOTOFLASH UNIT HAVING REMOTE CONTROL DEVICE TRANSMITTER FUNCTION

Yozo Iida, Komae; Yasuhito Kawahara, and Shigemi Igarashi, both of Tokyo, all of Japan, assignors to Nippon Kogaku K.K. and Sato Koki K.K., both of Tokyo, Japan

Filed Jan. 26, 1976, Ser. No. 652,156
Claims priority, application Japan, Jan. 31, 1975, 50-13479[U]
Int. Cl.[2] G03B *15/03;* H05B *41/14;* G03B *7/16*
U.S. Cl. 354—145 **1 Claim**



1. An electronic photoflash unit having functions as a remote control light transmitter and as a photoflash for flash photography, comprising:

a flash discharge tube;

a main capacitor for providing a discharge current to energize said flash discharge tube;

a trigger circuit connected to trigger the energization of said flash discharge tube causing discharge by said main capacitor;

a switching circuit connected to deenergize the radiation from the flash discharge tube;

a delay circuit selectively connected for actuating said switching circuit after a regulated time interval measured from the initiation of radiation from said flash discharge tube;

interlocking switch means provided in one of said switching circuit and said delay circuit, and having contacts for permitting the operation of said switching circuit by the output of said delay circuit when said photoflash unit is dismounted from said camera and for preventing the operation of said switching circuit by the output of said delay circuit when said photoflash unit is mounted on said camera; and

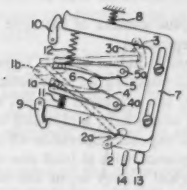
an accessory shoe having a slidable insulator member which is spring loaded outwardly thereof, wherein the accessory shoe is receivable in an accessory clip on a camera, and wherein said contacts of said interlocking switch means are separated from said slidable member and disposed in a closed position when the accessory shoe is disconnected from the accessory clip, and, when the accessory shoe is fixed in the accessory clip, said slidable member is displaced so as to engage with said interlocking switch means to hold said contacts in an open position.

4,091,399

MIRROR DRIVING DEVICE FOR A SINGLE LENS REFLEX CAMERA

Sachio Ohmori, Yokohama, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Dec. 15, 1975, Ser. No. 640,894
Claims priority, application Japan, Dec. 28, 1974, 49-1294
Int. Cl.[2] G03B *19/12*
U.S. Cl. 354—152 **10 Claims**



1. In a single lens reflex camera having a mirror movable upwardly and downwardly between raised and lowered positions in response to the opening and closing of the shutter, a mirror driving device comprising:

a. a first mirror holding member to hold the mirror at its lowered position;

b. a second mirror holding member to hold the mirror at its raised position;

c. driving means for applying a biasing force on the mirror for raising the mirror when the mirror is positioned at its lowered position and actuating the mirror by the release of the first mirror holding member,

and for applying a biasing force on the mirror for lowering the mirror when the mirror is positioned at its raised position and actuating the mirror by the release of the second mirror holding member,

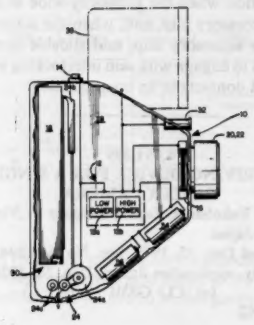
and for accelerating the mirror by discharging the energy due to said biasing force until the actuated mirror passes a neutral position where both biasing forces balance and then decelerating the mirror by absorbing the kinetic energy of the mirror after passing through the neutral position; and

d. an energy supplementing member interlocking in operation with said driving means so as to shift the neutral position between a first deviated position with respect to the middle point of the total angular displacement of the mirror by an amount corresponding to the supplement of the energy to compensate for frictional loss during the raising movement of the mirror and a second deviated position with respect to said middle point by an amount corresponding to the supplement of energy to compensate for frictional loss during the lowering movement of the mirror, the energy supplementing member locating at its first deviated position when the mirror is raised and locating at its second deviated position when the mirror is lowered.

4,091,400
MULTIPLE BATTERY CAMERA

Edwin H. Land, Cambridge, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Jan. 10, 1977, Ser. No. 757,993
Int. Cl.[2] G03B 17/00, 1/18, 7/16
U.S. Cl. 354—202 5 Claims



1. A photographic camera of the type powered by at least two batteries comprising:

selectively actuable means at least in part electrically energizable for conducting an automatic cycle of operation responsive to the actuation thereof, said automatic cycle of operation comprising a plurality of events including a photographic exposure operation all occurring in a predetermined sequence with at least one of said events requiring an electrical power input for its implementation of substantially greater magnitude than the electrical power input required to implement at least another of said events occurring immediately prior to said one event; and

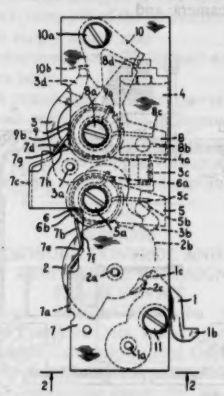
logic and switch means for connecting one of the two batteries to said selectively actuable means in response to the actuation thereof, said logic and switch means also operating to sense the completion of said other event and subsequently responding to connect the other of the two batteries in electrical power supplementing connection to the one battery, said logic and switch means also operating to sense the completion of a said event requiring said greater electrical power input, and subsequently responding to interrupt said electrical power supplementing connection between the two batteries while also operating to sense the completion of the last of said events in said predetermined sequence which requires electrical power for its implementation and subsequently responding to terminate any electrical connection between the two batteries and said selectively actuable means.

4,091,401
DRIVING FORCE-ADJUSTING MECHANISM FOR CAMERA SHUTTER

Masanori Watanabe; Eiichi Onda; Mitsuo Koyama; Ichiro Nemoto, and Tadashi Nakagawa, all of Yotsukaido, Japan, assignors to Seiko Koki Kabushiki Kaisha, Japan

Filed Jan. 21, 1977, Ser. No. 760,981
Claims priority, application Japan, Jan. 22, 1976, 51-5960
Int. Cl.[2] G03B 9/62
U.S. Cl. 354—266 6 Claims

1. In operating mechanism for a camera shutter, the combination of a pivoted actuating member for operating the shutter, a rotatable ratchet wheel coaxial with said actuating member, a driving spring biasing said actuating member in a direction to actuate the shutter, one end of said spring acting on said actuating member and the other end of said spring being supported by said ratchet wheel whereby the spring bias of said actuating member can be varied by rotary movement of said ratchet wheel, a spring plate overlying said actuating member, ratchet wheel and spring and providing a pivotal support for said actuating member and said ratchet wheel and a spring finger



portion of said spring plate engaging said ratchet wheel to retain said ratchet wheel in selected angular position against the reaction of said driving spring.

4,091,402
CAMERA SUPPORT BRACKET AND FLASH UNIT MOUNTING DEVICE

Philip Siegel, 7244 W. Touhy Ave., Chicago, Ill. 60648

Filed Dec. 20, 1976, Ser. No. 752,459
Int. Cl.[2] G03B 17/56
U.S. Cl. 354—293 10 Claims

1. A camera and flash unit mounting device comprising:

A. a unitary elongated standard having,

1. an integral handle formed on the lower end of said standard,
2. a first bracket support integral with said handle and extending therefrom at the bottom of said handle,
3. a rod integral with and extending upwardly from said handle,
4. a second bracket support integral with the rod and laterally extending therefrom at the top of said rod;

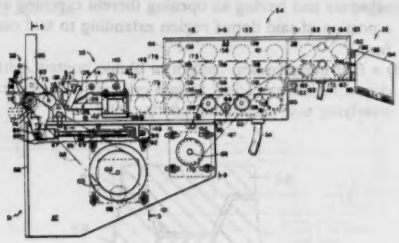
B. a camera mounting bracket having a substantially planar mounting surface adjustable along a plane substantially parallel to said elongated standard and removably connected to said first bracket support said mounting surface being substantially perpendicular to said plane; and

C. a flash unit mounting bracket adjustable in a direction at an angle relative to the plane of adjustment of said camera mounting bracket removably connected to said second bracket support.

4,091,403
DIAZO FILM ADVANCING MODULE

Dean H. Putnam, Toledo, Ohio, assignor to Magnagard Equipment Manufacturing Corporation, Toledo, Ohio

Filed Sep. 29, 1975, Ser. No. 617,595
Int. Cl.[2] G03D 7/00; G03B 29/00
U.S. Cl. 354—300 13 Claims

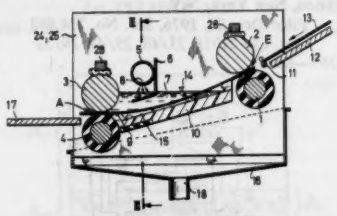


1. A film advancing module for developing an exposed segment of a continuous strip of microfilm, comprising:
- a developing chamber having a film input opening and a film exit opening;
- means for drawing the exposed segment through said developing chamber at a predetermined speed;
- a source of ammonia connected to said developing chamber; and
- a vapor trap at at least one of said developing chamber openings for removing ammonia vapor which has escaped from said developing chamber.

4,091,404
APPARATUS FOR DEVELOPING PHOTOSENSITIVE MATERIAL

Eberhard Schörnig, Taunusstein, and Gerhard Naumann, Wiesbaden-Biebrich, both of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Continuation of Ser. No. 318,837, Dec. 27, 1972, abandoned.
This application Jan. 22, 1976, Ser. No. 651,316
Claims priority, application Germany, Dec. 28, 1971, 2164981
Int. Cl.[2] G03D 3/08; G03G 15/10
U.S. Cl. 354—321 5 Claims

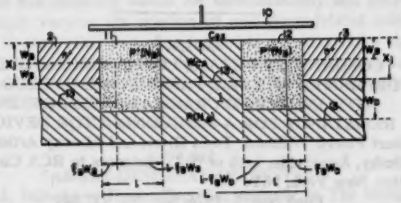


1. Apparatus for the liquid development of electrophotographic reproduction material, comprising a bath of developer liquid delimited by side walls, a bottom of a slightly curved support, a sealing lip, and a pair of squeeze rollers positioned near a lower end of said support, which support is adapted to guide said reproduction material in said developer liquid,
- a circulation system of circulating said developer liquid including a spraying pipe arranged above the open upper surface of said developer liquid, said spraying pipe being positioned near said squeeze rollers and partially screened by a baffle against said slightly curved support,
- and said developer liquid being dammed up by said pair of squeeze rollers to a height such that a sealing nip between said pair of squeeze rollers is completely submerged under said upper surface of the developer liquid.

4,091,405
INSULATED GATE FIELD EFFECT TRANSISTOR

Akira Ishida, Musashino, Japan, assignor to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Filed Aug. 3, 1976, Ser. No. 711,178
Claims priority, application Japan, Aug. 14, 1975, 50-98092
Int. Cl.[2] H01L 29/78
U.S. Cl. 357—23 4 Claims

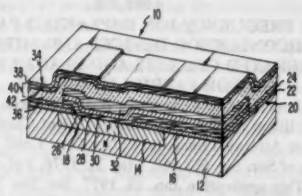


1. An insulated gate field effect transistor comprising:
- a semiconductor substrate of one conduction type;
- spaced source and drain regions formed beneath and extending to one surface of said semiconductor substrate and each of the opposite conduction type to that of said semiconductor substrate;
- a channel region provided between said source and drain regions at least at said one surface of said substrate;
- a gate insulating layer covering at least the surface of said channel region on said one surface of the substrate;
- an insulated gate electrode disposed on said gate insulating layer;
- two conductive regions of the same conduction type and having higher conductivity than that of said substrate and having a transverse dimension at least equal to that of said source and drain regions, a longitudinal dimension ranging from 1/7 to 2/5 times the spacing between said source and drain region, and contacting the transverse edges of said source and drain regions, respectively, at least at said surface of the substrate in said channel region, whereby the threshold voltage of the insulated gate field effect transistor is independent of the length of said channel region between said source and drain regions.

4,091,406
COMBINATION GLASS/LOW TEMPERATURE DEPOSITED $Si_xN_yH_zO_w$ PASSIVATING OVERCOAT WITH IMPROVED CRACK AND CORROSION RESISTANCE FOR A SEMICONDUCTOR DEVICE

William Newman Lewis, Bridgewater, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 1, 1976, Ser. No. 737,848
Int. Cl.[2] H01L 29/34
U.S. Cl. 357—54 5 Claims



1. In a semiconductor device having a body of semiconductor material having a surface, a primary passivating layer of insulating material disposed on said surface, said primary passivating layer including a layer of silicon nitride (Si_3N_4), a metallic conductor disposed thereon and a passivating overcoat including a glass layer disposed over said conductor, the

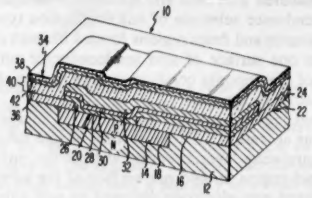
improvement comprising said passivating overcoat further including a low-temperature-deposited nitride layer disposed over said glass layer, said low-temperature-deposited nitride layer comprising a chemical compound having the formula $Si_wN_xH_yO_z$, wherein w, x, y and z are integers other than zero, and being deposited at a temperature below the eutectic temperature at which said metallic conductor begins to alloy with said semiconductor material.

4,091,407

COMBINATION GLASS/LOW TEMPERATURE DEPOSITED $SI_wN_xH_yO_z$ PASSIVATING OVERCOAT WITH IMPROVED CRACK AND CORROSION RESISTANCE FOR A SEMICONDUCTOR DEVICE

Robert Powell Williams, Toms River, and Murray Arthur Polinsky, Somerville, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Nov. 1, 1976, Ser. No. 737,849
Int. Cl.² H01C *29/34*
U.S. Cl. 357—54 **6 Claims**



1. A semiconductor device having an improved passivating structure, resistant to degradation in the presence of water vapor and corrosive atmospheres comprising:

a semiconductor body having a surface and PN junction-defining regions in said body adjacent to said surface,

a primary passivating layer of insulating material disposed on said surface, said primary passivating layer free of any layer of silicon nitride (Si_3N_4),

a metallic conductor disposed on portions of said primary layer, and

a secondary passivating overcoat disposed over exposed portions of said conductor and unmetallized portions of said primary passivating layer, said secondary overcoat including a glass layer and a low-temperature-deposited nitride layer comprising a chemical compound having the formula $Si_wN_xH_yO_z$, wherein *w, x, y,* and *z* are integers other than zero, said low-temperature-deposited nitride layer being deposited at a temperature below the eutectic temperature at which said metallic conductor begins to alloy with the semiconductor material.

4,091,408

HIGH FREQUENCY ION IMPLANTED PASSIVATED SEMICONDUCTOR DEVICES AND MIRCOWAVE INTERGRATED CIRCUITS AND PLANAR PROCESSES FOR FABRICATING BOTH

Don H. Lee, Agoura; Kenneth P. Weller, Rancho Palos Verdes, and William F. Thrower, Cerritos, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Division of Ser. No. 688,662, May 21, 1976, Pat. No. 4,030,943. This application Jan. 24, 1977, Ser. No. 762,547
Int. Cl.² H01L *29/06, 23/02*
U.S. Cl. 357—56 **12 Claims**

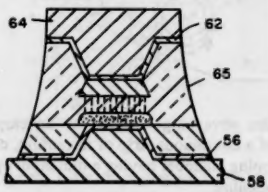
1. A high frequency semiconductor structure including, in combination:

(a) a high-resistivity semiconductor substrate having an ion implanted buried region therein and having an evacuated cavity region formed by the removal of a predetermined portion of said substrate and defining an opening aligned with said buried region for exposing at least a portion of same,

(b) one or more doped regions aligned with said buried region and defining part of a semiconductor device within said substrate, with one of said doped regions extending to one surface of said substrate,

(c) a passivating coating disposed on said one surface of said substrate and having an opening therein exposing at least a portion of said doped region extending to said one surface,

(d) a first metallization pattern in ohmic contact with said doped region extending to said one substrate surface and overlying said passivating coating, and



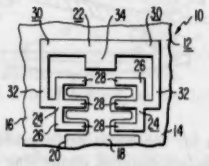
(e) a second metallization pattern disposed on the reverse surface of said substrate and extending into said evacuated cavity region and into ohmic contact with said buried region, whereby said first and second metallization patterns enable operating or modulating potentials to be applied to said semiconductor device or devices formed in said substrate, and said second metallization pattern provides heat sinking for said ion implanted regions while the thicker portion of said semiconductor substrate surrounding said ion implanted regions minimizes the parasitic capacitive coupling thereto.

4,091,409

SEMICONDUCTOR DEVICE HAVING SYMMETRICAL CURRENT DISTRIBUTION

Carl Franklin Wheatley, Jr., Somerset, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 27, 1976, Ser. No. 754,683
Int. Cl.² H01L *23/48, 29/44, 29/52*
U.S. Cl. 357—68 **6 Claims**



1. A semiconductor device comprising:

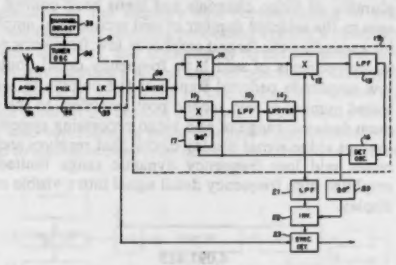
a body of semiconductor material having a surface, and

a layer of conductive material on said body, said layer having a configuration comprising; a first comb-like portion having a first back with ends and a first plurality of fingers extending from said first back; said configuration also comprising a trunk portion having a segment substantially parallel to said first back of said first comb-like portion, one end said trunk portion contacting said first back of said first comb-like portion at a point intermediate said ends thereof.

4,091,410
FREQUENCY AND PHASE LOCK LOOP SYNCHRONOUS DETECTING SYSTEM HAVING A PAIR OF PHASE LOCK CONDITIONS

Richard W. Citta, Oak Park, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Nov. 8, 1976, Ser. No. 739,672
Int. Cl.² H04N 9/50
U.S. Cl. 358—24 **9 Claims**



1. Demodulation means, having a detector oscillator and synchronous detecting means cooperating to recover information modulated upon a received carrier, comprising:

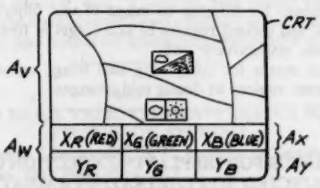
phase and frequency control means for maintaining a predetermined phase and frequency relationship between the detector oscillator signal and the modulated carrier, said control means being characterized by first and second stable subtantially constant-phase synchronization conditions, tending to result in first and second polarities of recovered information, respectively and

switch means, responsive to an information control signal from said phase and frequency control means, for assuring said first polarity of recovered information despite occurrence of either of said stable constant-phase conditions.

4,091,411
COLOR HUE CONTROL CIRCUIT FOR COLOR TELEVISION RECEIVER

Seiji Sanada, Yokosuka, and Katsuo Isono, Kawagoe, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 8, 1977, Ser. No. 785,945
Claims priority, application Japan, Apr. 12, 1976, 51-41085
Int. Cl.² H04N 9/535
U.S. Cl. 358—28 **17 Claims**

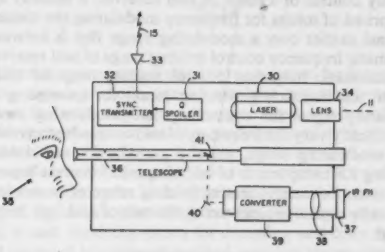


1. In a color television receiver having a color picture tube with a screen for displaying a color picture in response to the reception of a composite color television signal including a luminance component, a chrominance component constituted by color signals modulating a subcarrier, color burst signals, horizontal and vertical synchronizing signals and a phase reference signal inserted in a predetermined line interval of each vertical retrace interval of the composite color television signal: the combination of means for generating variable reference color signals; means for causing said color picture tube to display, on at least a portion of said screen thereof, areas of respective colors corresponding to said variable reference color signals; demodulating circuit means for demodulating said phase reference signal and said chrominance component so as to obtain demodulated color signals from the latter; means responsive to the demodulated phase reference signal for correcting errors in the hue of the color picture displayed on said screen in corresponding to the demodulated color signals due to phase distortions in said chrominance component of the received color television signal; and manually actuable hue adjusting means for simultaneously and correspondingly varying the relation of said demodulated color signals to each other and of said variable reference color signals to each other so that the hue of said areas of colors displayed on said screen will correspond to the hue of the color picture displayed on said screen.

4,091,412
TARGET DESIGNATION SYSTEM

David J. Salonimer, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation of Ser. No. 687,396, Dec. 1, 1967, abandoned. This application Dec. 29, 1972, Ser. No. 319,249
Int. Cl.² H04N 3/00
U.S. Cl. 358—108 **1 Claim**

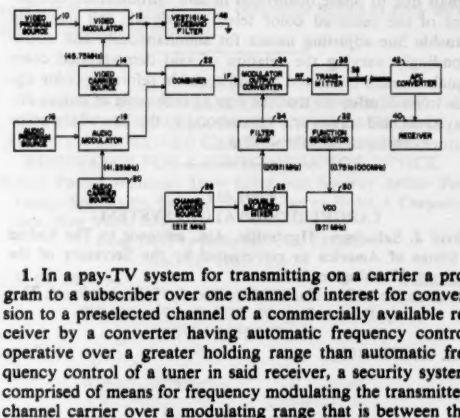


1. A designation system for a target in a cluttered background including a pulse laser; a pulse laser beam being emitted by said laser; a Q-spoiler connected to said laser so as to control the frequency of the output of the pulse beams from said laser; a synchronous transmitter connected to said Q-spoiler so as to transmit an output which is indicative of the frequency of the pulse beams; said pulse beam periodically illuminating said target; a remotely located detector; said detector including a first spectral filtering device which will pass illuminations reflected from the target caused by the laser beam and will stop other reflected illuminations; an imaging device; a first lens means passing the reflected laser beam illuminations from said filter to said imaging device; said imaging device having an electronic shutter means; a synchronous receiver means being connected to said electronic shutter so as to operate same; said synchronous receiver means receiving the information transmitted by said transmitter and causing said shutter of said image means to operate in synchronism with the frequency of the pulses of said laser beams; said synchronous transmitter and said synchronous receiver means having a wireless communication link therebetween said imaging means providing a visible image of the target; a focusing lens being located between said laser and said target so as to cause discrete illumination of the target; a telescope device aligned up in the direction of the laser beam and rigidly connected thereto for viewing the area illuminated by said laser and for directing the laser beam to a desired target; a second imaging means having a second spectral filtering device and focusing means for receiving reflected illuminations from the laser beam; and first and second mirror means connected between the second imaging means and the telescope means so as to allow viewing of both a telescope view and an imaged view to an observer.

4,091,413
SECURITY SYSTEM FOR PAY-TV CHANNEL

Richard E. Herman, 456 Dela Vina Ave., Monterey, Calif. 93940

Filed Jan. 17, 1977, Ser. No. 760,160
Int. Cl.[2] H04N 1/44
U.S. Cl. 358—118 10 Claims

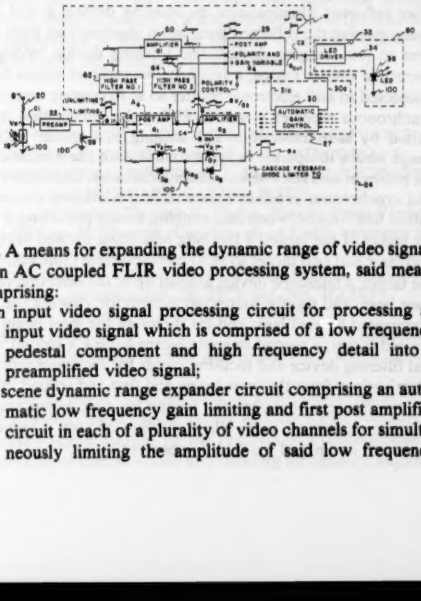


1. In a pay-TV system for transmitting on a carrier a program to a subscriber over one channel of interest for conversion to a preselected channel of a commercially available receiver by a converter having automatic frequency control operative over a greater holding range than automatic frequency control of a tuner in said receiver, a security system comprised of means for frequency modulating the transmitted channel carrier over a modulating range that is between the automatic frequency control holding range of said receiver and the automatic frequency control holding range of said converter, and function generating means for generating a low frequency signal for controlling said modulating means to periodically vary the frequency of said transmitted carrier over said modulating range, thereby periodically and coherently moving RF components of said channel of interest beyond the automatic frequency control holding range of tuners in commercially available receivers at the rate of said low frequency signal.

4,091,414
FORWARD LOCKING INFRARED VIDEO PROCESSING SYSTEM HAVING A SCENE DYNAMIC RANGE EXPANDER

Sen-Te Chow, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 28, 1977, Ser. No. 763,752
Int. Cl.[2] H04N 5/14
U.S. Cl. 358—174 5 Claims



1. A means for expanding the dynamic range of video signals in an AC coupled FLIR video processing system, said means comprising:

an input video signal processing circuit for processing an input video signal which is comprised of a low frequency pedestal component and high frequency detail into a preamplified video signal;

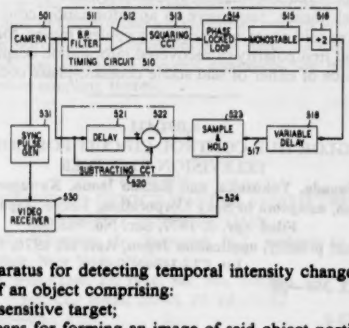
a scene dynamic range expander circuit comprising an automatic low frequency gain limiting and first post amplifier circuit in each of a plurality of video channels for simultaneously limiting the amplitude of said low frequency pedestal components and amplifying said high frequency detail to produce high frequency detail contained low amplitude pedestal signals therefrom and a second post amplifier in each of said plurality of video channels wherein said high frequency detail contained low amplitude pedestal signals are applied thereto for amplification to the dynamic range limits at the outputs therefrom and an automatic gain control circuit which is connected between the output and internal bias circuits of a selected number of said second post amplifiers in each of said plurality of video channels and feeds back control voltages to the selected number of said second post amplifiers for expanding the largest amplitude low frequency pedestal components of said high frequency detail contained low amplitude pedestal signals at the outputs of said selected number of said second post amplifiers to the maximum dynamic range of said video processing system; and

an output video signal display circuit that receives and processes said low frequency dynamic range limited and amplified high frequency detail signal into a visible output display.

4,091,415
METHOD AND APPARATUS FOR DETECTING TEMPORAL CHANGES IN AN OBJECT

John Ormond Limb, Tinton Falls, N.J., and Charles Edwin Roos, Nashville, Tenn., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J., a part interest

Filed Mar. 4, 1977, Ser. No. 774,481
Int. Cl.[2] H04N 7/18
U.S. Cl. 358—105 21 Claims



7. Apparatus for detecting temporal intensity changes in a portion of an object comprising:

a light sensitive target;

first means for forming an image of said object portion on first and second regions of said target at first and second times, respectively; and

second means for comparing said image on said first and second regions to detect said changes.

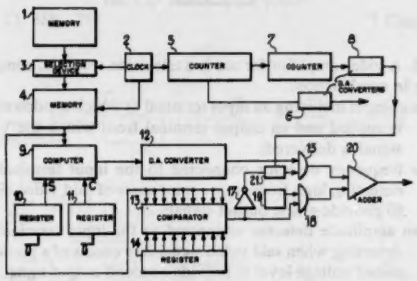
4,091,416
APPARATUS FOR DISPLAYING A SECTION OF A BODY SUBJECTED TO PENETRATING RADIATION, IN PARTICULAR X RAYS OR GAMMA RAYS

Jacques Riethmuller, and Jean Pierre Vasseur, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Sep. 9, 1975, Ser. No. 611,685
Claims priority, application France, Sep. 13, 1974, 74 31148
Int. Cl.[2] H04N 7/18
U.S. Cl. 358—111 7 Claims

1. In a display cathode ray tube apparatus, capable of displaying the image of a preselected plane section of a body, after irradiation of said body by penetrating radiations by means of meshes, each of which represents a mesh of said section, said latter being divided up into rows and columns, a control electrode in said tube for controlling the brilliance of each of said meshes as a function of the opacity towards said radiations, of

the corresponding mesh of said section, comprising means connected to said control electrode, for selecting meshes whose brilliance is comprised between predetermined adjustable limits, means for adjusting said limits, and means connected to said control electrode, for differentiating the appearance of said selected meshes, from the remainder of said meshes, a data processing system containing said opacity data corresponding to said section and digital to analog converter means connected to said system for controlling said control electrode, a synchronising clock, controlling on the one hand the selection of the memory data corresponding to said selected section from said data processing system; a computer for receiving said data, and in response, furnishing numbers, each number representing a given range of opacities, a first digital to analog converter connected to said computer, whose output voltage controls the control electrode in said display tube, said clock also controlling a point counter, a line counter, second digital to analogue converter devices, connected to said counters, controlling the horizontal and the vertical scanning respectively of said tube, said computer having a first and a second input, a first register storing the number form which said control electrode blocks said tube and a second register controlling correspondence between luminosity of the mesh and the number transducing the corresponding opacity coefficient, said first and second registers controlling respectively first and second computer inputs, said selecting means including a comparator system having a first group of inputs connected to said computer output, and having respectively the state "0" and "1" corresponding to the number manifested by said storage device in the binary code, a second group of inputs, a register having its respective stages respectively connected to said second group of inputs, said stages having the states "0" and "1" corresponding respectively to the selected number in said code, a two state "0" and "1" output, said output taking the state "1" at the coincidence of said numbers, and a logic circuit connected to said output for controlling said control electrode.



4,091,417

DECODER MODE VALIDATION APPARATUS FOR PAY TELEVISION SYSTEMS

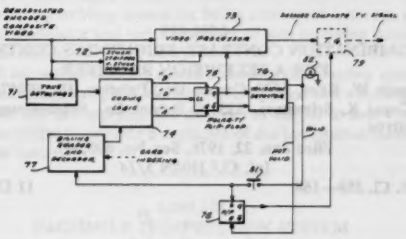
Norman Nieson, Massapequa, N.Y., assignor to Teleglobe Pay-TV System, Inc., Rego Park, N.Y.

Division of Ser. No. 553,436, Feb. 26, 1975, Pat. No. 4,024,574. This application Feb. 23, 1977, Ser. No. 771,202

Int. Cl.[2] H04N *1/44*

U.S. Cl. 358—117 **6 Claims**

1. In a pay television system having, at the transmitting end, means for furnishing a television signal, encoding means coupled to said television signal furnishing means for changing a predetermined characteristic of said television signal from a first to a second value in response to an encoder control signal, thereby creating an encoded television signal, and transmitting means for transmitting said encoded television signal, and, at the receiving end, processing circuit means for changing said predetermined characteristic from said second value back to said first value in response to a decoder control signal, and decoding means operable in a plurality of decoder modes, connected to said processing circuit means, and responsive to code signals, for furnishing said decoder control signal only in response to code signals selected in accordance with the then-present decoder mode, a validation system for furnishing a validation signal only if said decoding means is in a predetermined decoder mode, comprising, in combination, at the transmitting end: timing signal furnishing means for furnishing a timing signal at a plurality of predetermined time instants in said television signal; means for furnishing a plurality of code signals each having a characteristic value differing from the corresponding characteristic value of others of said code signals; inserting means for inserting said code signals into said television signal, each in response to an enabling signal; validation code selector means interconnected between said timing signal furnishing means and said inserting means, for furnishing enabling signals to code signal furnishing means selected to create at the receiving end, a predetermined number of said decoder control signals within a predetermined time interval only if said decoding means is in said predetermined decoder mode; and at the receiving end: receiving means for receiving the so-transmitted television signals and furnishing received television signals corresponding thereto; detecting means connected to said receiving means for detecting said code signals in said received television signal and applying the so-detected code signals to said decoding means; and counting means for counting the number of decoder control signals created by said code signals within said predetermined time interval and furnishing said validation signal only if the number of so-counted decoder control signals is equal to said predetermined number.



4,091,418

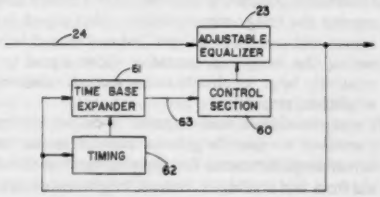
AUTOMATIC CHANNEL EQUALIZATION WITH TIME BASE EXPANSION

Walter S. Ciciora, Park Ridge, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Mar. 2, 1977, Ser. No. 773,718

Int. Cl.[2] H04N *5/14*

U.S. Cl. 358—160 **19 Claims**



1. An automatic equalization system for equalizing a television channel according to the distortion exhibited by a reference signal contained in a television signal transmitted through said channel, said system comprising:

signal equalization means connected in the path of said television channel, said equalization means being selectively controllable for equalizing said television channel;

conversion means having an input connected to said path for sampling said television signal at a relatively fast rate during intervals including said reference signal and having an output for subsequently reconstructing said sampled television signal at a relatively slow rate; and

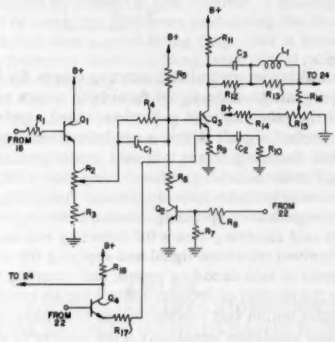
control means responsive to said output of said conversion means for deriving from said reconstructed television signal set point data controlling said equalization means for equalizing said television channel.

4,091,419

COMBINATION CONTRAST/BRIGHTNESS CONTROL FOR A TELEVISION RECEIVER

Dennis W. Rhee, 1108 Cooper Dr., Palatine, Ill. 60067, and Gopal K. Srivastava, 523 N. Bristol Ln., Schaumburg, Ill. 60194

Filed Jun. 22, 1976, Ser. No. 698,367
Int. Cl.² H04N 5/14
U.S. Cl. 358—168 **11 Claims**



1. In a television receiver having a cathode ray tube (CRT) for displaying images, an image-representative video signal amplifier comprising:

(a) a source of an image representative video signal, the image-representative video signal including periodic fly-back pulses;

(b) a driver amplifier means for providing an amplified video signal to its output electrode, which in turn is coupled to the CRT, said driver amplifier means having an input electrode;

(c) combined contrast/brightness control means coupled to receive the image-representative video signal from said source and settable to at least first and second settings for setting the image-representative video signal to a first, relatively large amplitude and a second, relatively small amplitude, respectively; and

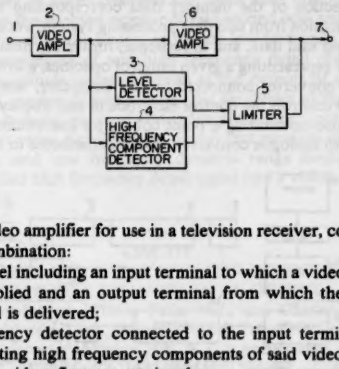
(d) compensation means disposed in-circuit between said combined contrast/brightness control means and said driver amplifier means for applying the varied video signal from said combined contrast/brightness control means to said input of said driver amplifier means and including means for varying the voltage level at said input of said driver amplifier means dependent upon the setting of said combined contrast/brightness control means, whereby for the first setting of said combined contrast/brightness control means, the dark portion of the CRT image is at a black level and for the second setting of said combined contrast/brightness control means, the dark portion of the CRT image is at a gray level.

4,091,420

VIDEO AMPLIFIER

Yasuo Omori, and Hiroshi Kataoka, both of Yokohama, Japan, assignors to Victor Company of Japan, Limited, Yokohama, Japan

Filed Jan. 7, 1977, Ser. No. 757,610
Claims priority, application Japan, Jan. 9, 1976, 51/644[U]
Int. Cl.² H04N 5/14
U.S. Cl. 358—184 **8 Claims**



1. A video amplifier for use in a television receiver, comprising in combination:

a channel including an input terminal to which a video signal is applied and an output terminal from which the video signal is delivered;

a frequency detector connected to the input terminal for detecting high frequency components of said video signal to provide a first output signal;

an amplitude detector connected to the input terminal for detecting when said video signal is in excess of a predetermined voltage level to provide a second output signal; and

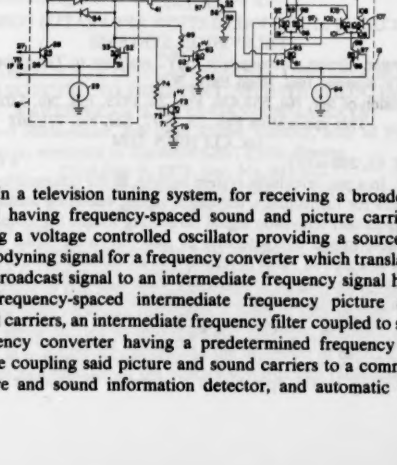
a clamping circuit responsive to a simultaneous occurrence of said first and second output signals for clamping the amplitude of said video signal at said output terminal to said predetermined voltage level.

4,091,421

TELEVISION AFC SYSTEM HAVING COMPLEMENTARY SOUND AND PICTURE CARRIER CONTROL EFFECTS

Michael E. Long, Brookfield, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Apr. 28, 1977, Ser. No. 791,894
Int. Cl.² H04N 5/50
U.S. Cl. 358—195 **6 Claims**



6. In a television tuning system, for receiving a broadcast signal having frequency-spaced sound and picture carriers, having a voltage controlled oscillator providing a source of heterodyning signal for a frequency converter which translates said broadcast signal to an intermediate frequency signal having frequency-spaced intermediate frequency picture and sound carriers, an intermediate frequency filter coupled to said frequency converter having a predetermined frequency response coupling said picture and sound carriers to a common picture and sound information detector, and automatic fre-

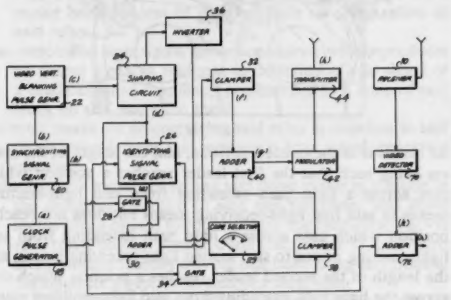
quency control means controlling the frequency of said oscillator, the improvement comprising:

means producing an automatic frequency control signal which includes a first control effect produced by said intermediate frequency picture carrier and a second complementary control effect produced by said intermediate frequency sound carrier, said first and second control effects retaining like polarity for frequency deviations of said intermediate frequency signal above and below the desired frequency and having zero effect at said desired frequency.

4,091,422
APPARATUS FOR SELECTIVELY TRANSMITTING TELEVISION IMAGES FROM A PLURALITY OF CAMERAS TO A MONITOR

Gerald Amster, 100 Beekman St., New York, N.Y. 10038

Filed Dec. 8, 1976, Ser. No. 749,392
Int. Cl.² H04N 5/22, 7/00
U.S. Cl. 358—210 **7 Claims**



1. A system for selectively transmitting television images including video signals comprising:

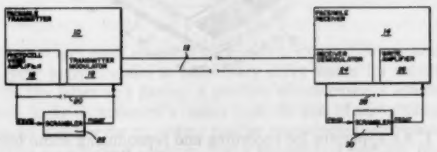
a plurality of television cameras for generating image signals, said cameras being placeable at different respective locations; and

at least a single television receiver for selectively receiving and monitoring one of said image signals, said receiver including means for generating common line and field synchronizing signals for said cameras, and activation-signal generating-means for generating activation signals for said cameras, respectively, said activation signals and said synchronizing signals being transmittable to said cameras, respectively, as electronic signals via transmission means a camera being selectively activated by an activation signal transmitted from said activation-signal generating means to the selected camera.

4,091,423
SYNCHRONOUS DIGITAL DATA SCRAMBLING SYSTEM

Kenneth M. Branscome, Dallas, Tex., assignor to Datotek, Inc., Dallas, Tex.

Filed Mar. 17, 1975, Ser. No. 559,389
Int. Cl.² H04N 1/44; H04L 7/00
U.S. Cl. 358—259 **16 Claims**



1. A system for scrambling facsimile signals transmitted between a transmitting facsimile station and a receiving facsimile station comprising:

first scrambling means for being connected between the video amplifier and the transmitter of said transmitting facsimile station,

means for generating a randomized digital keystream,

means for selectively varying said randomized digital keystream,

said first scrambling means including digitizing circuitry for digitizing the output of said video amplifier and further including enciphering means for enciphering said digitized output of said video amplifier according to said randomized digital keystream and for transmitting said enciphered digitized output through said transmitter to said receiving facsimile station,

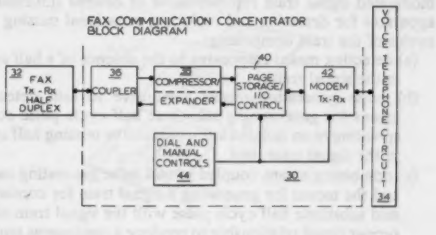
second scrambling means for being connected between the demodulator and write amplifier of said receiving facsimile station,

said second scrambling means including deciphering means for deciphering the enciphered output of said demodulator and for applying the deciphered output to said write amplifier to provide a duplicate of the transmitted facsimile material.

4,091,424
FACSIMILE COMPRESSION SYSTEM

Robert D. Widergren, San Jose, Calif., assignor to Compression Labs, Inc., Campbell, Calif.

Filed Feb. 18, 1977, Ser. No. 770,021
Int. Cl.² H04B 7/12
U.S. Cl. 358—260 **10 Claims**



1. In a method for sending binary facsimile data through a communications system including the steps of generating a binary facsimile signal by resolving black and white portions of a document to be transmitted into a binary sequence along sequentially parallel scan lines, sending said binary sequence over a communications link to a receiving location and creating a facsimile of said document in accordance with said sent binary sequence at said receiving location, a method of compressing said binary facsimile data for transmission over said link and expansion of said data at said receiving location, comprising the steps of compressing data for transmission by:

locating in a memory a binary matrix of each individual character of said document;

defining a rectangle around each said located matrix;

sizing the rectangle to be the smallest possible size capable of surrounding said matrix and producing a coordinate location and rectangle size signal in accordance therewith;

scanning said matrix within said sized rectangle to produce a binary sequence corresponding to the black and white portions of the character represented by said matrix;

transmitting through said link said location and size signal and said binary sequence, and said facsimile signal expanding said compressed data sent to said receiving location by the steps of:

converting each said sent location and size signal and said binary sequence into a binary matrix corresponding to a character;

loading a memory storage with each said binary matrix in order;

scanning said memory along sequentially parallel scan lines to provide a binary facsimile signal of each said character;

converting said binary facsimile signal into a restored facsimile signal;

using said restored facsimile signal to create a facsimile reproduction of said document.

4,091,425

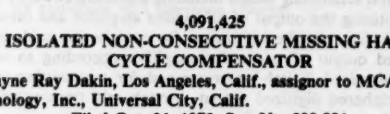
ISOLATED NON-CONSECUTIVE MISSING HALF CYCLE COMPENSATOR

Wayne Ray Dakin, Los Angeles, Calif., assignor to MCA Technology, Inc., Universal City, Calif.

Filed Oct. 24, 1972, Ser. No. 299,891

Int. Cl.[2] H04N 5/76

U.S. Cl. 360—38 **9 Claims**



1. In combination with means for generating a frequency modulated signal train representative of desired information, apparatus for detecting and replacing occasional missing half cycles of the train comprising:

(a) detecting means responsive to the absence of a half cycle in the signal train;

(b) pulse generating means responsive to said detecting means for generating a substitute half cycle pulse corresponding to an isolated non-consecutive missing half cycle in the signal train; and

(c) combining means coupled to said pulse generating means and the means for generating a signal train for combining said substitute half cycle pulse with the signal train in the proper timed relationship to produce a continuous sequential output signal train in which substitute half cycle pulses maintain the frequency of said output signal train within predetermined limits.

4,091,426

DEVICE FOR DETECTING AN END OF A CASSETTE TAPE

Hiroyuki Umeda, Yokohama, Japan, assignor to Victor Company of Japan, Limited, Yokohama, Japan

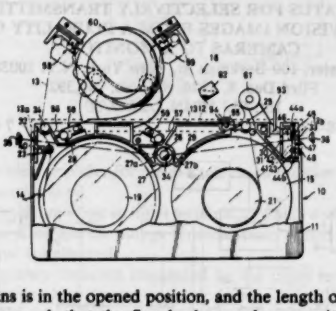
Filed Dec. 13, 1976, Ser. No. 750,220

Claims priority, application Japan, Dec. 13, 1975, 50-168236; Jun. 11, 1976, 51-74969

Int. Cl.[2] G11B 15/00

U.S. Cl. 360—74 **2 Claims**

1. A device for detecting the ends of a tape in a tape cassette, said tape cassette comprising a first reel having a first hub and a second reel having a second hub, an opaque tape having first and second transparent leaders integrally fixed to the opposite ends thereof, said tape being connected at the opposite ends of said leaders to said first and second hubs, cassette case means for receiving and accommodating said first and second reels, said case having a front face terminated at opposite ends by spaced side walls respectively having first and second windows formed therein, a part of said tape being exposed through said first and second windows on the opposite side walls thereof respectively, and lid means hinged on said cassette to swing between a closed position where said lid means covers said front face and said first and second windows and an opened position where said lid means exposes said front face and said first and second windows; detector means within the cassette case comprising one light-emitting means, first and second light-receiving means respectively disposed opposite said light-emitting means and said first and second windows when said lid means is in the opened position, means comprising said first light-receiving means for detecting one end of the tape in response to light passing through said first leader and said first window when said lid means is in the opened position, and means comprising said second light-receiving means for detecting the other end of the tape in response to light passing through said second leader and said second window when said



lid means is in the opened position, and the length of the leaders being such that the first leader reaches a position which cuts across a light path extending from said light-emitting means to said first light-receiving means but does not reach a position which cuts across a light path extending from said light-emitting means to said second light-receiving means, and the length of the second leader reaches a position which cuts across the light path extending from said light-emitting means to said second light-receiving means but does not reach a position which cuts across the light path extending from said light-emitting means to said first light-receiving means, whereby the light receiving means illuminated by the light path is indicative of the direction of tape travel.

4,091,427

ELECTRIC CONTROL SYSTEM FOR MAGNETIC SHEET RECORDING AND REPRODUCING APPARATUS FOR AUDIOVISUAL INSTRUCTION

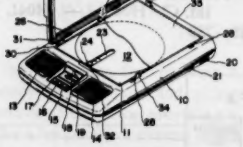
Masao Iwaoka; Yosuke Igeta; Toyochika Kiku; Fumio Kobayashi, and Tatsuhiko Sugai, all of Tokyo, Japan, assignors to Gakken Co., Ltd., Tokyo, Japan

Filed Oct. 2, 1975, Ser. No. 618,898

Claims priority, application Japan, Mar. 8, 1975, 50-27610

Int. Cl.[2] G11B 21/02

U.S. Cl. 360—101 **9 Claims**



1. An apparatus for recording and reproducing audio information on and from a stationary magnetic sheet, wherein a magnetic head is driven by an electric drive motor to follow a

track on the magnetic sheet for recording or playback, wherein said track on said magnetic sheet includes a zone where a signal of a predetermined frequency is prerecorded, an electric control system comprising, in combination:

electric power supply means for running said electric drive motor; magnetic head mounting means guiding said head for movement along said track in either direction upon rotation of said electric drive motor;

first switch means for setting said drive motor in rotation in one direction thereby driving said head along said track in one direction for recording or playback;

second switch means for terminating the rotation of said drive motor in said one direction;

a relay energized upon actuation of said first switch means;

a holding circuit being closed upon initial energization of said relay to hold said relay energized, said holding circuit being opened upon actuation of said second switch means to de-energize said relay;

relay contact means actuated upon energization of said relay to connect said drive motor from said electric power supply means for rotation in said one direction, said drive motor being set out of rotation upon de-energization of said relay;

an automatic stop signal generator circuit which produces an output signal in response to detection of said signal of a predetermined frequency prerecorded in a zone of said track on said magnetic sheet;

circuit means for de-energizing said relay in response to said output signal from said automatic stop signal generator circuit;

third switch means for setting said drive motor in rotation in the direction opposite to said one direction, said drive motor being caused to rotate in said opposite direction via said relay contact means during actuation of said third switch means thereby driving said head along said track in the opposite direction to said one direction;

said drive motor having a winding means functioning as an magnetic brake by being short-circuited when said drive motor is set out of rotation;

muting switch means that is ganged with said third switch means to make the apparatus incapable of recording and playback operations during rotation of said drive motor in said opposite direction.

4,091,428

ROTARY HEAD ASSEMBLY

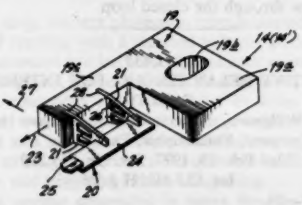
Etsuro Saito, Kanagawa, and Katsumasa Takahashi, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jun. 1, 1976, Ser. No. 691,845

Claims priority, application Japan, May 30, 1975, 50-72947[U]

Int. Cl.[2] G11B 5/54

U.S. Cl. 360—104 **11 Claims**



1. A rotary head assembly comprising: rotary drive means; a support body coupled to said rotary drive means for rotation with the latter and having a portion which extends substantially in the direction of a radius from the axis of said rotation; a head member for recording and/or reproducing information signals on a record medium; and a plurality of parallel, resilient, cantilevered platelike support arms extending substantially at right angles to said radius and being spaced apart in said direction of the radius, each of said arms having a cross-section which is relatively small in the direction of the radius and relatively large in the direction parallel to the axis so as to flex substantially only in the direction of the radius, one end of each of said resilient support arms being secured to said portion of the support body and the other end of each of said support arms being secured to said head member so that centrifugal movement of said head member relative to said support body in response to said rotation of the latter is resiliently resisted by flexing of said support arms while holding said head member substantially in alignment relative to said record medium, said cantilevered support arms extending from said portion of the support body substantially in the direction opposed to the direction of said rotation, and each of said platelike arms having apertures therein for decreasing the mass thereof and thereby minimizing the influence of centrifugal force thereon.

4,091,429

DEVICE FOR THE MAGNETIC RECORDING BY MEANS OF A MAGNETIC STRIP DOMAIN AS A RECORDING/PLAYBACK HEAD

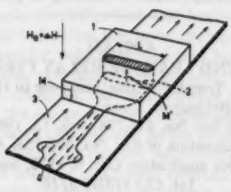
Frederik Ate de Jonge; Jan Willem Frederik Dorleijn; Willem Frederik Druyvesteyn, and Gerrit Jan Koel, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 592,451, Jul. 2, 1975, abandoned, which is a continuation of Ser. No. 430,787, Jan. 4, 1974, abandoned. This application Dec. 16, 1976, Ser. No. 751,345

Claims priority, application Netherlands, Jan. 10, 1973, 7300311; Sep. 7, 1973, 7312331

Int. Cl.[2] G11B 5/30, 5/12

U.S. Cl. 360—110 **15 Claims**



1. A device for magnetic recording having a generally planar layer of a magnetisable material, said layer having an easy axis of magnetisation which is substantially perpendicular to said generally planar layer, said layer including means for supporting magnetic domains having a magnetisation direction which is opposite to the magnetisation direction of the remainder of said layer, means for supporting said layer, means for producing a magnetisation field having a field direction perpendicular to the plane of said layer, said layer cooperating with an associated recording medium which is relatively movable with respect to said layer, said layer of magnetisable material further comprising at least one elongate magnetic domain said elongate magnetic domain having one outside dimension measured in the plane of said planar layer which is greater than a second outside dimension measured in the plane of said generally planar layer, said device including means for modulating said one outside dimension of said elongate magnetic domain responsive to an information signal.

4,091,430

GUARD CIRCUIT FOR HIGH IMPEDANCE SIGNAL CIRCUITS

Clement Alphonse Berard, Trenton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 11, 1976, Ser. No. 741,069

Int. Cl.[2] H02H 7/20

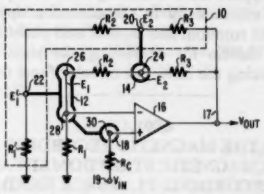
U.S. Cl. 361—43 **6 Claims**

1. A circuit for guarding high impedance signal paths from

leakage currents, said circuit having a plurality of elements being connected at terminals defining nodes of the circuit, said circuit being in an environment wherein leakage currents may affect said circuit in the vicinity of said nodes, comprising:

a. guard means for establishing corresponding potential nodes in a path that parallels the signal path, said nodes being of a potential level substantially the same as the potential level that exists at the respective nodes in said signal path; said guard means including;

b. impedance elements connected between said nodes of said parallel path of impedance values substantially smaller



than corresponding impedances of said signal path for maintaining said nodes at substantially the same potential level as corresponding nodes of the signal path;

c. conductor means extending from each of said nodes of said parallel guard means path to the respective corresponding nodes of said signal path, said conductor means being formed to substantially surround said signal path nodes so as to substantially isolate said signal path nodes from leakage currents;

said conductor means being at substantially the same voltage potential as the potential of said signal path nodes.

4,091,431

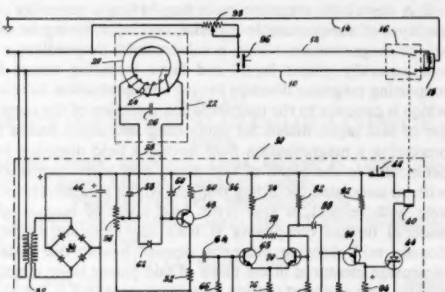
GROUND LEAKAGE RELAY CIRCUIT

Alton R. Morris, Trumbull, Conn., assignor to Harbey Hubbell, Incorporated, Bridgeport, Conn.

Continuation of Ser. No. 615,774, Feb. 13, 1967, abandoned, which is a continuation of Ser. No. 856,523, Aug. 22, 1969, abandoned. This application Oct. 9, 1970, Ser. No. 79,649

Int. Cl.[2] H02H *3/16*

U.S. Cl. 361—45 **10 Claims**



1. A ground leakage relay circuit for use in an alternating current system including at least one supply line and a return which comprises: detection means responsive to the vector sum of the currents in said supply line and return to produce an error signal proportional thereto; capacitance means; diode means in series with said capacitance means; d.c. supply means connected to charge said capacitance means; shunt means in parallel with said capacitance means and diode means and having a high impedance state and a low impedance state; control circuit means responsive to said error signal to change said shunt means from its low impedance state to its high impedance state during the existence of an error signal of preselected amplitude; circuit breaker means in at least said supply line; and circuit breaker actuating means responsive to the charge on said capacitance means to open said circuit breaker means on the occurrence of a voltage of preselected amplitude across said capacitance means.

4,091,432

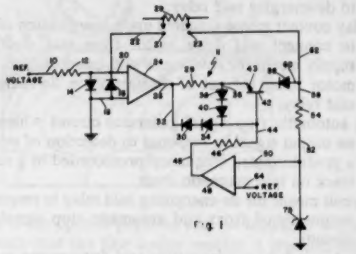
CONSTANT CURRENT-SOURCE WITH HIGH VOLTAGE PROTECTION, COMPLIANCE CIRCUIT

Peter Robert Muller, Lakeside, Calif., assignor to Aiken Industries, Inc. California Instruments Division, San Diego, Calif.

Filed Oct. 1, 1976, Ser. No. 728,756

Int. Cl.[2] H02H *3/20*

U.S. Cl. 361—56 **4 Claims**



1. In a closed loop operational amplifier circuit for providing a constant current in the closed loop for generating a precision constant current through an unknown resistance for enabling the value of the resistance to be determined by measuring the resultant voltage drop across the resistance, a circuit for protecting the operational amplifier circuit from a high voltage that is externally applied across the operational amplifier circuit, comprising

a transistor switch for enabling current flow through the closed loop;

a biasing circuit for biasing the transistor switch to control current flow through the transistor switch;

current limiting means for limiting the magnitude of the current through the transistor switch;

high voltage diode means connected to the output of the transistor switch for preventing externally applied high voltage induced current flow in a given polarity direction through the transistor switch; and

means coupled to the biasing circuit and responsive to an externally applied high voltage induced current flow in the opposite polarity direction for causing the biasing circuit to reverse bias the transistor switch to inhibit current flow through the closed loop.

4,091,433

PROTECTIVE RELAY CIRCUIT FOR INTERPHASE FAULTS

Stanley B. Wilkinson, Havertown, Pa., assignor to General Electric Company, Philadelphia, Pa.

Filed Feb. 10, 1977, Ser. No. 767,279

Int. Cl.[2] H02H *3/26*

U.S. Cl. 361—76 **12 Claims**

1. A protective relay circuit for controlling tripping of three poles of a circuit breaker connected in a three phase alternating current power line in response to a fault involving more than a single phase, comprising:

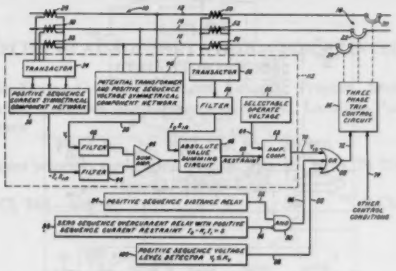
(a) means for developing a first signal representative of the positive sequence symmetrical component of the line voltages of said power line at the relay location,

(b) means for developing a second signal representative of the product of the positive sequence symmetrical compo-

nent of the currents in said power line and a predetermined constant impedance;

(c) means for summing said first and second signals to produce a difference output signal representative of said first signal minus said second signal;

(d) means for developing a third signal which is representative of the product of the zero sequence symmetrical component of the currents in said power line and said predetermined constant impedance;



(e) means for summing the absolute value of the difference output signal of said summing means and the absolute value of said third signal to provide a restraining signal output representative of the sum of said absolute values; and

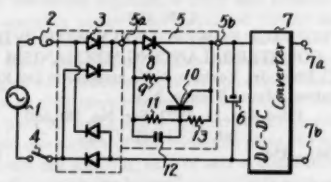
(f) comparator means for generating a three pole trip signal output for controlling tripping of said circuit breaker in response to the restraining signal falling below a selected predetermined value.

4,091,434

SURGE CURRENT PROTECTION CIRCUIT

Tadao Suzuki, and Shigeaki Wachi, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Oct. 12, 1976, Ser. No. 731,766
Claims priority, application Japan, Oct. 16, 1975, 50-124723
Int. Cl.[2] H02H *7/10*
U.S. Cl. 361—100 **9 Claims**



1. A surge current protection circuit comprising an input terminal supplied with a rectified voltage, an output terminal to be connected to a load, a semiconductor controlled rectifier comprising gate, anode, and cathode electrodes, the anode and cathode electrodes being connected in series between said input and output terminals, and triggering means connected between said input and output terminals to supply a trigger voltage to the gate electrode of said semiconductor controlled rectifier, said triggering means comprising:

a first resistor connected in series between the gate and anode electrodes of said semiconductor controlled rectifier to supply a trigger voltage to said gate;

a transistor having base, emitter, and collector electrodes, the collector and emitter electrodes of said transistor being connected in series between the gate and cathode electrodes of said semiconductor controlled rectifier; and

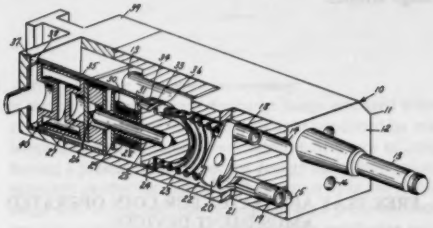
biasing means comprising a series circuit connected between said input and output terminals for applying a bias voltage to the base electrode of said transistor, said series circuit comprising second and third resistors, said third resistor being connected between the base and emitter electrodes of said transistor, and said bias voltage across said third resistor being larger than the trigger voltage of said semiconductor controlled rectifier so as not to allow said semiconductor controlled rectifier to conduct when the voltage difference between said input and output terminals exceeds a predetermined value.

4,091,435

TELEPHONE PROTECTOR MODULE HAVING HEAT COIL FIRED FLAG INDICATOR

Omprakash Ahuja, Long Island City, N.Y., assignor to Porta Systems Corp., Syosset, N.Y.

Filed Dec. 27, 1976, Ser. No. 754,544
Int. Cl.[2] H02H *3/22*
U.S. Cl. 361—119 **1 Claim**



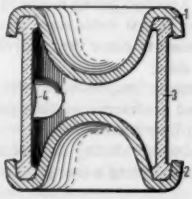
1. In a telephone protector module including a casing element, a plurality of contacts for interconnection with an individual telephone subscriber line, and heat-sensitive means for grounding said individual line upon the occurrence of excessive current and/or voltage surges, said heat sensitive means including at least one component movable within said casing element upon actuation, the improvement comprising: means for indicating the actuation of said heat-sensitive element externally of said casing element, said means including an elongated length of wire having a colored insulative cover which contrasts with the color of said casing element, a first end of said wire being secured to said one component, and a second end of said wire projecting through an opening in said casing element; said second end lying normally flush with the outer surface of said element bordering said opening therein, and projecting outwardly of said surface upon actuation of said heat-sensitive means.

4,091,436

KNOB TYPE SURGE VOLTAGE ARRESTER

Gerhard Lange, and Gerhard Peche, both of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Oct. 26, 1976, Ser. No. 735,907
Claims priority, application Germany, Jan. 23, 1976, 2602569
Int. Cl.[2] H02H *3/22*
U.S. Cl. 361—120 **11 Claims**



1. In a knob type surge voltage arrester formed as a gas-filled housing with curve-shaped electrodes opposite one another

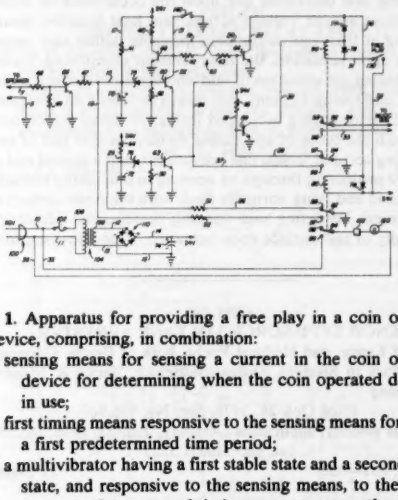
inserted in ends of a tube-shaped insulating member of the housing, convex curvature portions of the electrodes which face each other forming active arcing surfaces of the electrodes, a coating of electrically conductive ignition material being coated over a part of the interior of the insulating member, the improvement which comprises coating the electrically conductive material on the interior of the insulating member at a level corresponding to the center of a discharge path defined by the active surfaces of the electrodes, the conductive material extending substantially parallel to a center axis substantially only between said active arcing surfaces and being shaped such that the spacing of the active surfaces of the electrodes from one another is smaller than the spacing of the active surfaces of either of the electrodes from the coating of electrically conductive material, and the conductive material extending on the insulating member as a narrow strip in a circular path for a given arc about the center axis of the surge voltage arrester.

4,091,437

FREE PLAY APPARATUS FOR COIN OPERATED AMUSEMENT DEVICES

Walter Soroka, 5350 Virginia Dr., Youngstown, Ohio 44515

Filed Oct. 12, 1976, Ser. No. 731,727
Int. Cl.² H01H *47/00*
U.S. Cl. 361—166 **7 Claims**



1. Apparatus for providing a free play in a coin operated device, comprising, in combination:

sensing means for sensing a current in the coin operated device for determining when the coin operated device is in use;

first timing means responsive to the sensing means for timing a first predetermined time period;

a multivibrator having a first stable state and a second stable state, and responsive to the sensing means, to the switch means, and to a second timing means to cause the multivibrator to go to its first stable state, and responsive to the first timing means to cause the multivibrator to go to its second stable state;

second timing means responsive to the multivibrator for timing a second predetermined time period after the first predetermined time period;

switch means actuable during the second predetermined time period for selecting a free play in the coin operated device; and

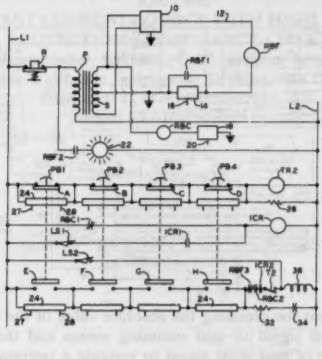
voltage means to provide a source of current for the first timing means, the second timing means, and the switch means.

4,091,438

PRESS CONTROL SYSTEM

Michael J. Olding, Minster; Ronald F. Fortman, Fort Loramie, and William J. Stewart, St. Mary's, all of Ohio, assignors to The Minster Machine Company, Minster, Ohio

Filed Jan. 31, 1977, Ser. No. 763,842
Int. Cl.² H01H *47/32*
U.S. Cl. 361—189 **12 Claims**



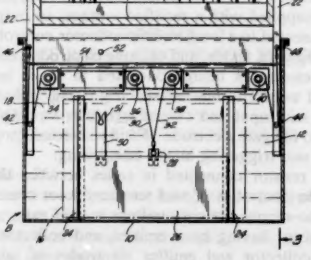
1. In an electric control system for a machine having a plurality of pushbutton actuated switch blades, depression of said pushbuttons from a released position causing the machine to cycle; a plurality of monitoring circuits each connected in parallel with a switch blade and each monitoring circuit having a pair of output terminals at respective logic voltages and which alternate between high and low levels as the respective switch blade opens and closes, a relay controllable for interrupting operation of said machine, logic circuitry having inputs connected to said output terminals of said monitoring circuits and having an output at which a fault signal appears upon malfunction of any of said switch blades, and circuit means connecting said output of said logic circuitry to said relay for control of the relay when a fault signal is developed at said output terminal.

4,091,439

HIGH VOLTAGE POWER SUPPLY WITH INTERNAL COUNTERBALANCING MECHANISM

William C. Blair, Jr., Yonkers, N.Y., assignor to Del Electronics Corporation, Mount Vernon, N.Y.

Filed Apr. 11, 1977, Ser. No. 786,600
Int. Cl.² H02B *1/18*
U.S. Cl. 361—334 **19 Claims**



1. A high voltage power supply comprising a transformer, electronic components associated with said transformer, an enclosure in which said transformer and said electronics are

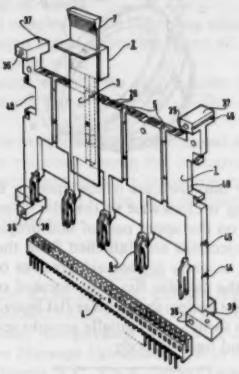
situated, an enclosure cover movable between a first position wherein the enclosure is closed and a second position wherein the interior of the enclosure is accessible, a support to which said electronic components are mounted, said support being connected to said cover and movable therewith, and means, situated within said enclosure and operably connected to said cover, to facilitate movement thereof between said first and second positions.

4,091,440

MECHANICAL SUPPORT SYSTEM FOR PRINTED CIRCUIT BOARDS

Claude Gelin, Creteil, and Jean Lavigne, Fresnes, both of France, assignors to CGEE Alsthom S.A., Levallois-Perret, France

Filed Jan. 26, 1977, Ser. No. 763,256
Claims priority, application France, Jan. 29, 1976, 76 02405
Int. Cl.[2] H02B *1/02*
U.S. Cl. 361—415 **8 Claims**



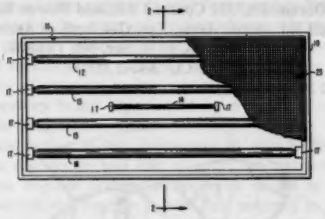
1. A mechanical support system for printed circuit boards, said support system comprising *n* identical elementary sub-assemblies assembled together, *n* being any positive integer, each sub-assembly comprising: *m* printed circuit boards, *m* connectors for the "high-level" signals, a molded plastics mounting plate, interlocking, sliding, cooperating complementary fixing means carried respectively on one of the two surfaces of *m* printed circuit board and on one surface of said mounting plate for fixing said *m* printed circuit boards side by side, on said one surface of said mounting plate, the number *m* lying between one and four; each of said *m* connectors for the "high-level" signals being integral respectively with one of the *m* printed circuit boards, being mounted on said one surface of said *m* printed circuit board and projecting outwardly therefrom, said plastics mounting plate including an edge facing and aligned with an edge of said *m* connectors for the high level signals and having holes therein receiving female contacts, and wherein each of said *m* connectors for the "high-level" signals includes *p* male contacts which plug into *p* female contacts disposed in *p* holes in said mounting plate, output wires crimped to said female contacts carried by said plastics mounting plate, the number *p* lying between one and four; at least one connector for the "low-level" signals, anchor clips formed integrally with said mounting plate along an edge opposite to that carrying said female contact and snap fitted to said connector for the "low-level" signals and said connector for the "low-level" signals being slotted to receive the projecting end of said *m* printed circuit board and carrying connectors for contact with circuit means carried by said *m* printed circuit board laterally offset from the plane of contact between the female contacts of said mounting plate and the male contacts of said *m* connectors for the "high-level" signals.

4,091,441

FULL-SPECTRUM LUMINAIRE

John Nash Ott, Sarasota, Fla., assignor to John Ott Laboratories, Inc., Sarasota, Fla.

Continuation of Ser. No. 700,089, Jun. 28, 1976, abandoned.
This application Nov. 4, 1977, Ser. No. 848,575
Int. Cl.[2] F21S *7/00*; H05B *35/00*
U.S. Cl. 362—1 **5 Claims**



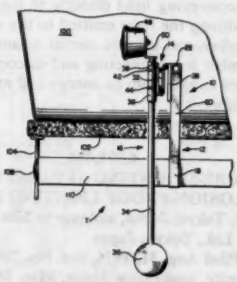
1. A full-spectrum luminaire comprising:
first and second types of gas discharge lamps arranged when energized to project the combined light produced by said lamps into an area to be illuminated the first type of lamp having a predetermined spectral energy distribution characteristic producing radiant energy primarily in the visible range and the second type of lamp having a predetermined spectral energy distribution characteristic producing radiant energy primarily, but not entirely, in the near ultraviolet range, with a peak output at approximately 360 nanometers, said second type of lamp having an output overlapping that of the first lamp in a wavelength band of approximately 350 to 475 nanometers whereby the combined light output of the lamps produced by the luminaire has a spectral energy distribution characteristic approximating that of natural daylight in both the near ultraviolet and visible ranges.

4,091,442

TRAILER LIGHT

John Webb Markey, 2713 Sorrell St., Baton Rouge, La. 70805

Filed Oct. 18, 1976, Ser. No. 733,443
Int. Cl.[2] B60Q *1/00*; F21V *21/14*
U.S. Cl. 362—61 **9 Claims**



1. A trailer electrical light assembly mountable to a trailer, which assembly comprises:
a. mounting means attachable to the side of said trailer;
b. an elongated, hollow sleeve attached to said mounting means at a point above the attachment point of said mounting means to said trailer, said sleeve having its long axis substantially perpendicular to the horizon;
c. an elongated rod slidably fitted within said sleeve;
d. an electrical light fixture attached to said rod at a point

adjacent its upper end so that said light fixture will be positioned above the upper end of said sleeve; and

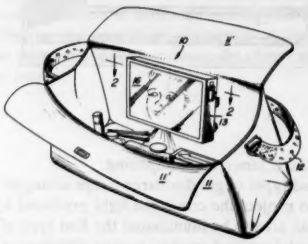
e. a flotation device attached to said rod at a point adjacent its lower end so that said flotation device will be positioned below the lower end of said sleeve.

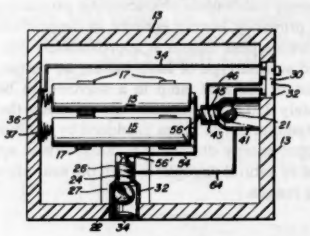
4,091,443

MULTIPURPOSE LIGHT WITH MIRROR

Henry Ohrenstein, 239 Concord Rd., and Sharon L. Wells, 224 Pennell Rd., Aston Arms, Apt. G-4, both of Aston, Pa.

Filed Aug. 16, 1976, Ser. No. 714,837
Int. Cl.[2] A45C *15/06*
U.S. Cl. 362—156 **7 Claims**





1. A portable light device comprising; a lightweight box-like, hollow rectangularly shaped body member having planar walls and a back, and constructed from a material which is light diffusing and transmitting, at least one light emitting device, mounted on one of the walls of the body member, and arranged for conveying light directly to the same one of the walls and confining the light emitted to the walls and back of the body member, and electric circuit means disposed within the body member for connecting and disconnecting the light emitting device to and from an energy cell arrangeable within the body member.

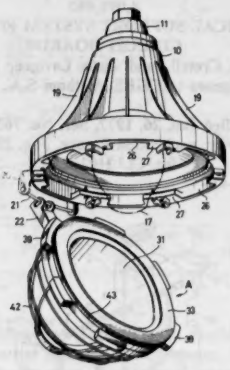
4,091,444

GLOBE-MOUNTING APPARATUS FOR EXPLOSION-PROOF LIGHTING DEVICES

Shinjiro Mori, Tokyo, Japan, assignor to Mori Denki Manufacturing Co., Ltd., Tokyo, Japan

Filed Aug. 31, 1976, Ser. No. 719,388
Claims priority, application Japan, Mar. 26, 1976, 51-33980
Int. Cl.[2] F21V *17/00*
U.S. Cl. 362—374 **5 Claims**

1. A globe mounting apparatus for explosion-proof devices comprising a lighting body which holds an electric light inside, a globe member and a hinge which joins the lighting body and the globe member, said lighting body containing, at the periphery of the opening thereof, a circular flat body containing a circular groove formed on the outside of the flat surface and towards the inside of the lighting body, said circular body being provided with cuts and projections at the periphery thereof, said projections having bolts fastened to the surface thereof which protrude slightly into said circular grooves, said globe member made up essentially of a globe holder and a globe, said globe holder containing, at the periphery thereof, a circular flat body provided with clamps located below the circular flat body in a number corresponding with the number of cuts provided at the opening of the lighting body and being shorter than said cuts, said globe holder containing packing underneath said circular flat body and wherein the globe member is secured to the lighting body by inserting the clamps on



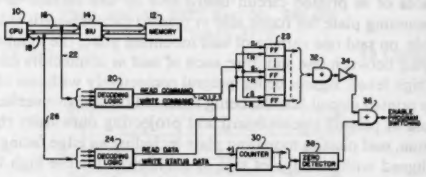
the globe holder into the cuts in the opening of the lighting body and twisting it clockwise so that the clamps fit into the grooves located on the upper part of said projections and the bolts on said projections are tightened from the underside to hold the clamps securely in the said grooves on the lighting body, whereby the circular flat body located on the lighting body is held firmly against the circular flat body located on the globe member to form a substantially airtight seal between the globe member and lighting body.

4,091,445

PROGRAM SWITCHING MONITOR

Charles P. Ryan, Phoenix, Ariz., assignor to Honeywell Information Systems Inc., Waltham, Mass.

Filed Jan. 18, 1977, Ser. No. 760,300
Int. Cl.[2] G06F *9/00*
U.S. Cl. 364—200 **5 Claims**



1. In a data processing system including at least a central processing unit, a memory unit for storing a plurality of computer programs, and an interface unit coupled to said central processing unit and to said memory unit for communicating signals representative of commands, data and status there between a monitoring apparatus coupled to said processing unit and said interface unit for receiving said signals, for reliably switching between computer programs executed by said central processing unit said monitoring comprising:

indicating means including a plurality of flip-flops;

first decoder means responsive to certain ones of said signals corresponding to outgoing commands coded for specifying transfers of a group of words to be transferred to said interface unit generating signals indicative of the occurrence of read and write commands, said first decoder

means being coupled to said indicator means and operative to each signal indicative of a read command to set an individual one of said flip-flops for each double word of a group of words specified by said read command to be read from said memory unit;

counter means coupled to said first decoder means, said counter means being responsive to each signal indicative of a Write command to increment said counter by one;

second decoder means responsive to signals received from said interface unit for generating signals indicative of read data signals and write status signals as responses to corresponding ones of said outgoing commands, each pair of said read data signals indicative of completion of a transfer of a group of words read from said memory unit in response to a previously sent read command, said second decoder means being coupled to said indicating means and to said counter, said counter responsive to each occurrence of a write status signal to decrement said counter by one each of said read data signals resetting an individual one of the flip-flops that were set for each double word of said group of words;

logic means coupled to said indicating means for generating a first output signal indicating when all of said flip flops are in the reset state;

detector means coupled to said counter for generating a second output signal when said counter is in a zero state; and,

output means coupled to said logic means and to said detector means responsive upon the concurrence of said first and second output signals to provide an enabling signal for signaling when said central processor could reliably switch programs.

4,091,446

DESK TOP ELECTRONIC COMPUTER WITH A REMOVABLY MOUNTED ROM

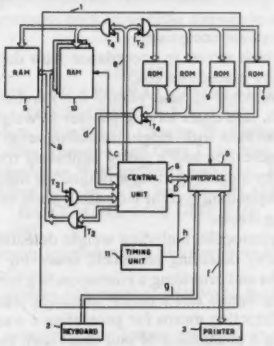
Filippo Demonte, Borgofranco d'Ivrea (Turin), and Mario Figini, Bosco Marengo (Alessandria), both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed Jan. 7, 1976, Ser. No. 647,000

Claims priority, application Italy, Jan. 24, 1975, 67146 A/75; Sep. 12, 1975, 69275 A/75

Int. Cl.[2] G06F *15/02, 13/00*

U.S. Cl. 364—200 **16 Claims**



1. An electronic desk top computer comprising a keyboard having a set of numeric keys for entering data, a first memory for recording and reading data, a second memory for storing a plurality of programs, said second memory being of the read only type and being removably mounted on the computer, a central processing unit connected to said keyboard and said first and second memories operable under the control of program instructions for processing data, and output means connected to said central processing unit for displaying the output of said electronic desk top computer, wherein the improvement comprises:

a portion of said second memory including a plurality of program registers each associated with one of the plurality of programs in said second memory, each one of said plurality of programs registers storing a jump instruction and the program address of the associated program for controlling a jump to the associated program;

at least one address register in said first memory for temporarily storing the program register address of at least one of said plurality of program registers in said portion of said second memory, the program register addresses of said plurality of program registers in said portion of said second memory being represented by a series of numeric codes in progressive order;

address extracting means connected to said at least one address register in said first memory for extracting the program register address temporarily stored in said at least one address register in said first memory to address the associated program register of said plurality of program registers in said portion of said second memory;

manually operable first control means connected to said address extracting means for controlling the operation of said address extracting means;

recording means connected to said at least one address register in said first memory for conditioning said at least one address register in said first memory to record the program register address of at least one of said plurality of program registers in said portion of said second memory; and

manually operable second control means connected to said recording means for controlling the operation of said recording means by enabling said recording means to condition said at least one address register in said first memory to record data entered by said numeric keys of said keyboard as the program register address of at least one of said plurality of program registers in said portion of said second memory.

4,091,447

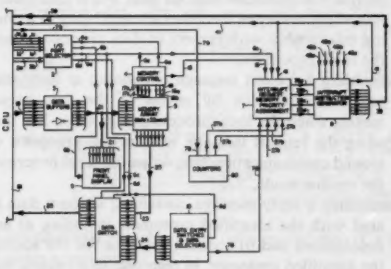
INTERRUPT CONTROL SYSTEM FOR A MICROCOMPUTER

Ronald David Dillon, Charleston, and John Frederick Fisher, Saint Albans, both of W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Filed Jul. 19, 1976, Ser. No. 706,673

Int. Cl.[2] G06F *9/18*

U.S. Cl. 364—200 **6 Claims**



1. An interrupt control system for handling a multiplicity of real time interrupt request signals to a central processing unit of a microcomputer comprising:

means including a multiplicity of interrupt control sections each having an assigned level of priority for generating a predetermined interrupt pulse in response to the occurrence of each of said interrupt request signals;

means responsive to the level of priority of each interrupt request signal for locking out each interrupt control sec-

tion to which interrupt request signals of lower priority are applied;

means for generating an interrupt instruction for said central processing unit in response to each predetermined interrupt pulse;

means for generating an interrupt busy signal of predetermined duration in response to the generation of an interrupt instruction; and

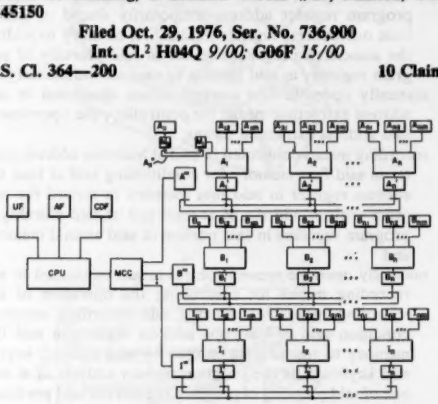
means responsive to said interrupt busy signal for inhibiting such multiplicity of interrupt control sections during said predetermined time duration.

4,091,448

OFF-LINE, ONE-LEVEL/ON-LINE, TWO-LEVEL TIMESHARED AUTOMATED BANKING SYSTEM

Martin B. Clausing, 2 Concord Woods #17, Milford, Ohio 45150

Filed Oct. 29, 1976, Ser. No. 736,900
Int. Cl.[2] H04Q *9/00*; G06F *15/00*
U.S. Cl. 364—200 **10 Claims**



1. In an automated banking system which is alternatively operative in an on-line mode and an off-line mode and which is available to a plurality of customers, a method for processing banking transactions, including the steps of:

reading a card with customer identification and customer information, including customer credit information and customer available-transaction information, encoded thereon at one of a plurality of customer stations,

sending said customer identification and customer information to a local processor which is associated with the plurality of customer stations over a first communication link, the plurality of customer stations being in a timesharing relationship with respect to data processing means at the local processor,

assembling a request message containing at least said customer identification by means of the data processing means, when the local processor is in an on-line mode,

sending the request message to a central processor over a second communication link, when the local processor is in the on-line mode,

assembling a reply message containing account data associated with the identified customer, including a) account descriptions and b) account balances for the accounts of the identified customer, in response to a request message sent to the central processor,

sending the reply message to the local processor over the second communication link, after the reply message has been assembled in response to a request message,

determining a transaction selection by means of the data processing means at the local processor in response to the account descriptions in the reply message when the local processor is in the on-line mode and in response to the customer available-transaction information when the local processor is in the off-line mode,

sending the transaction selection from the local processor to the customer station over the first communication link,

permitting the identified customer to a) choose a transaction in accordance with the transaction selection and b) enter a transaction amount at the customer station,

sending the transaction choice and amount from the customer station to the local processor over the first communication link,

processing the transaction by means of the data processing means at the local processor in response to the transaction choice and amount a) in accordance with the account balances in the on-line mode and b) in accordance with the customer credit information in the off-line mode so as to determine the allowability of the transaction,

sending execution commands from the local processor to the customer station over the first communication link, and

completing the transaction at the customer station in accordance with the execution commands,

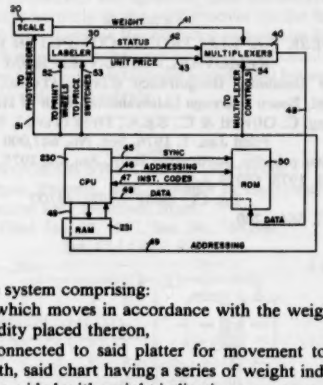
whereby data processing functions associated with transactions are executed by the local processor and input/output functions associated with transactions are relegated to the customer stations.

4,091,449

COMPUTING SCALE SYSTEM

Robert C. Meckstroth, Dayton, and Edwin E. Boshinski, Englewood, both of Ohio, assignors to Hobart Corporation, Troy, Ohio

Filed Jan. 27, 1976, Ser. No. 652,851
Int. Cl.[2] G06F *15/20*; G01G *19/40*
U.S. Cl. 364—466 **47 Claims**



1. A scale system comprising:

a platter which moves in accordance with the weight of a commodity placed thereon,

a chart connected to said platter for movement together therewith, said chart having a series of weight indicating tracks provided with weight indicating areas arranged for weight indication and a parity indicating track provided with parity indicating areas arranged for indicating parity for corresponding weight indicating areas on said weight indicating tracks,

a series of photocells, including weight detecting photocells and a parity detecting photocell, observing said areas in said tracks and providing a corresponding series of weight indicating signals and a parity indicating signal,

transition detecting means for generating a transition signal indicating a positioning of said chart such that one of the photocells observing a weight indicating track is observing an edge of one of said weight indicating areas,

display means for presenting a visual representation of said weight indicating signals,

parity checking means for checking said weight indicating signals against said parity indicating signal and inhibiting the operation of said display means whenever a parity error is detected,

parity check suppressing means for interrupting inhibiting control of said display means by said parity checking

means whenever said (threshold) transition signal is generated (.), and

function control means connected with said transition detecting means, display means and parity checking means for sequentially enabling events in the operating cycle of said scale system.

4,091,450

METHOD AND APPARATUS FOR SET POINT CONTROL FOR STEAM TEMPERATURES FOR START-UP OF THE TURBINE AND STEAM GENERATOR IN UNIT POWER PLANTS

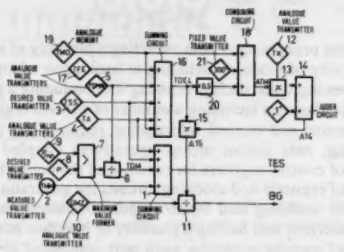
Heinz Bloch, Nussbaumen, and Max Salm, Wettingen, both of Switzerland, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Nov. 18, 1976, Ser. No. 742,761

Claims priority, application Switzerland, Jan. 28, 1976, 1061/76

Int. Cl.² G06G 7/63; F01K 13/02; F01D 19/00

U.S. Cl. 364—494 **5 Claims**



1. A method for simultaneously starting up a steam turbine and a steam generator comprising the steps of:

(a) steadily increasing the load absorption of said steam turbine from a first to a second value;

(b) simultaneously and steadily increasing the temperature of said steam as it enters said turbine from a first to a second value;

(c) coordinating the rate of change of said load absorption and said steam temperature such that both quantities reach their respective second value simultaneously and in a time which produces only acceptable stresses in said turbine.

4,091,451

METHOD OF AND APPARATUS FOR MAKING UP A THREADED CONNECTION

Peter D. Weiner, Woodlands; Charles W. Calhoun, Houston; Jerry A. Collins, Houston, and Gary Lynn Mee, Houston, all of Tex., assignors to Weatherford/Lamb, Inc., Houston, Tex.

Filed Apr. 26, 1977, Ser. No. 791,113

Int. Cl.² G01L 5/24; G06F 9/16

U.S. Cl. 364—506 **7 Claims**

7. An apparatus for making up two members having mating threads comprising,

means for rotating one member relative to the second member,

means for measuring the torque required to make up the threaded connection,

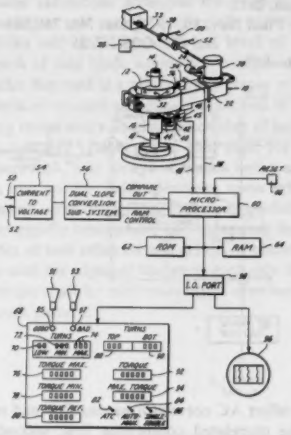
means for measuring the number of turns of rotation of one member relative to the second member,

a processor for receiving the torque and turns measurements,

means connected to the processor for inserting values of low, minimum and maximum turns, and reference, minimum, and maximum torque into said processor,

said processor indicating that a makeup is proceeding to failure when the torque required to further threadedly interengage said mating threads exceeds certain predetermined parameters,

said processor including means for removing the count of



the number of turns if the measured torque becomes lower than the reference torque, and means for restarting the counting of the number of turns when the measured torque equals the reference torque.

4,091,452

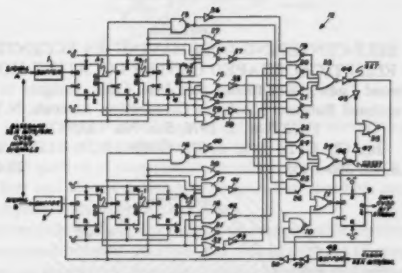
CVSD DIGITAL ADDER

Charles Robert Maggi, Morris Plains, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Oct. 22, 1976, Ser. No. 734,854

Int. Cl.² G06F 7/50

U.S. Cl. 364—768 **12 Claims**



1. A continuously variable slope delta modulation (CVSD) digital adder comprising:

first means to separately store in succession a plurality of different adjacent CVSD bits of at least two CVSD bit streams, each of said plurality of bits being capable of having a plurality of different CVSD bit combinations;

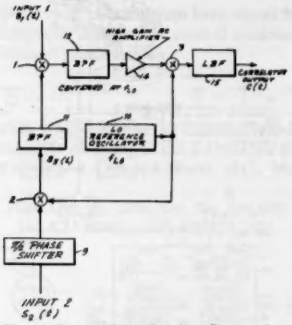
second means coupled to said first means to generate a first sum output digital signal and a second sum output digital signal different than said first signal; and

third means coupled to said second means responsive to said first and second sum output digital signals to provide a sum CVSD bit stream at an output of said adder.

4,091,453
LOW OFFSET AC CORRELATOR

Gayle P. Martin, Indialantic, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 10, 1976, Ser. No. 740,584
Int. Cl.[2] G06G 7/19
U.S. Cl. 364—819 1 Claim

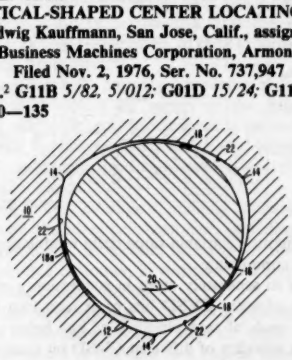


1. A low offset AC correlator having first and second input signals to be correlated comprising first, second, and third mixers, said first and second mixers operating as multipliers and said third mixer as a demodulator, a local oscillator providing a reference signal at a preselected frequency, a $\pi/2$ phase shifter for said second input signal, said second mixer receiving simultaneously said reference signal and the $\pi/2$ phase shifted second input signal to provide therefrom a resultant signal being a correlation product of a modulated carrier type, a first bandpass filter interconnecting said second and first mixers for transferring said resultant signal, said first bandpass filter having a preselected bandwidth at a preselected center frequency, said first mixer also receiving said first input signal to provide therefrom an output signal, a high gain AC amplifier, a second bandpass filter of a preselected bandwidth at a preselected center frequency transferring said output signal to said high gain AC amplifier to provide an AC amplified signal, said third mixer receiving simultaneously said AC amplified signal and said reference signal to synchronously demodulate to a DC level the AC amplified signal for a DC output, and a low pass filter receiving the DC output for filtering thereof.

4,091,454
SELF-CENTERING DISK HAVING AN ECCENTRIC ELLIPTICAL-SHAPED CENTER LOCATING HOLE

Elwood Ludwig Kauffmann, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 2, 1976, Ser. No. 737,947
Int. Cl.[2] G11B 5/82, 5/012; G01D 15/24; G11B 3/62
U.S. Cl. 360—135 20 Claims



1. A disk record member for self-centering around a drive hub in an assembly comprising:

a flat substrate essentially circularly shaped;

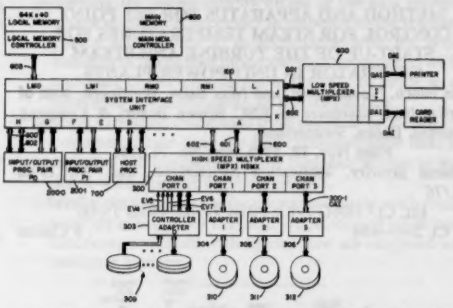
a multilobed center locating drive hole in said substrate; formed from eccentric arcuate bearing surfaces; and

means for storing information on said substrate.

4,091,455
INPUT/OUTPUT MAINTENANCE ACCESS APPARATUS

John M. Woods, Glendale; Marion G. Porter, and Earnest M. Monahan, both of Phoenix, all of Ariz., assignors to Honeywell Information Systems Inc., Waltham, Mass.

Filed Dec. 20, 1976, Ser. No. 752,345
Int. Cl.[2] G06F 15/16, 11/00
U.S. Cl. 364—200 30 Claims



1. A data processing system including a plurality of modules, said plurality of modules including at least a pair of input/output processing units, each processing unit including a plurality of storage elements including a number of control registers for storing status and control information required for program processing, data output means operatively coupled to said number of control registers for read out of the contents of said number of registers and clocking circuits for generating timing signals for enabling said input/output processing unit and a system interface unit having a plurality of interface ports and a number of transfer networks, each port connected to a different one of said modules and to said transfer networks, wherein said system interface unit controls the transfer of information between said ports, said system further including maintenance apparatus for facilitating diagnosis of failures within any one of said plurality of processing units detected as faulty comprising:

interface means included within the port of each input/output processing unit, said interface means being connected to said clocking circuits;

command register means for storing commands, command decode circuit means, and a plurality of registers included in said system interface unit, said command register means being connected to receive commands from any one of said number of transfer networks, said command decode circuit means connected to said command register means and operative to generate control signals in response to said commands, a first one of said registers being coupled to said interface means of each port for storing coded signals designating different configurations of at least a pair of said plurality of input/output processing units to be enabled for operation, said first register storing signals representative of an unlocked configuration bit pattern designating that only one of said pair is to be enabled and the other one of said pair of disabled for being faulty, said signals conditioning said interface means to inhibit the operation of the clocking circuits to the other one of said pair of input/output processing units having been detected as being faulty; and,

control circuit means included in each of said input/output processing units, said control circuit means being coupled to said data output means, said clocking circuits and to said interface means,

said command decode circuit means being operative in response to a predetermined sequence of commands from said one of said pair of input/output processing units to generate a sequence of control signals, said interface means of the port of said faulty processing unit in response to said control signals conditioning said control circuit means to enable said data output means to apply the con-

tents of a predetermined one of said number of control registers to the one of said number of transfer networks connected to said port thereby not altering the state of said faulty processing unit defined by the status of said plurality of storage elements, and

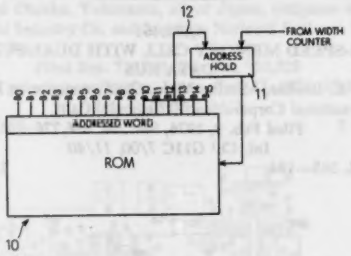
said one of said number of transfer networks being conditioned by said control signals to transfer said contents to one of said plurality of registers for use during subsequent fault analysis.

4,091,456

ROM CONTROLLED COMMUNICATION SYSTEM

Virgil Alphonse Ehresman, and George W. McIntyre, both of Salt Lake City, Utah, assignors to Sperry Rand Corporation, New York, N.Y.

Filed Sep. 2, 1976, Ser. No. 719,767
Int. Cl.[2] G06F *3/05*
U.S. Cl. 364—900 **12 Claims**



1. A system for providing a digital output stream for transmission over a single channel, comprising in combination:

multiplexer means;

said multiplexer means having a plurality of channels each having a continuous information wave on its input;

first means for sampling each output from each of said channels in a predetermined sequence wherein sampling of certain ones of said channels may occur more often than the sampling of other ones of said channels;

second means connected to said multiplexer means for converting the sampled continuous wave to a digital output having a predetermined number of bits;

first register means connected to said second means for storing said digital output;

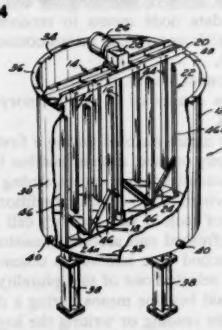
third means connected to said register means providing said digital output in a serial data stream as an output.

4,091,457

MIXER FOR VISCOUS MATERIALS

Michael Slywka, Parma, Ohio, assignor to The Gibson-Homans Company, Cleveland, Ohio

Filed May 23, 1977, Ser. No. 799,384
Int. Cl.[2] B01F *7/18*
U.S. Cl. 366—304 **19 Claims**



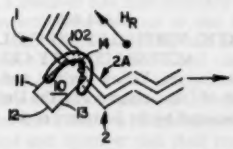
1. An apparatus for mixing highly viscous materials comprising a vessel having a generally vertically extending, centrally located shaft adapted to be rotationally driven and a stirrer arranged within said vessel for stirring operation upon rotation of said shaft, said stirrer including upwardly and downwardly extending blade assemblies arranged for relative rotational movement and cross arm means transversely extending within said vessel from said shaft at the lower level of said blade assemblies, each of said blade assemblies comprising an array of spaced blades disposed in a substantially planar arrangement with blades located on each side of said shaft, one of said arrays of blades being rotationally fixed and the other of said arrays of blades being operably connected to said shaft for rotational movement therewith, said arrays of blades being arranged to pass through one another with clearance upon relative rotational movement, said cross arm means comprising a cross blade member rigidly connecting and extending between the adjacent blades of said other of said arrays of blades in a sawtooth pattern with the adjacent blades on each side of said shaft being fixed to the shaft by said cross blade member extending in said sawtooth pattern.

4,091,458

MULTIPLE CHEVRON PASSIVE GENERATOR

Peter K. George, Placentia, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jun. 14, 1976, Ser. No. 696,016
Int. Cl.[2] G11C *19/08*
U.S. Cl. 365—12 **7 Claims**



1. A passive magnetic bubble domain generator comprising,

a first pattern of propagation members,

a second pattern of propagation members,

said first and second patterns of propagation members each comprise a plurality of chevrons,

a substantially rectangular pattern of magnetizable material interposed between said first and second patterns of propagation members to provide coupling between said rectangular pattern and said first and second patterns of propagation members in response to applied magnetic fields, and

a projected pattern portion extending from said substantially rectangular pattern for affecting said coupling by establishing a magnetic pole which severs a magnetic bubble domain stretched across said projected pattern portion in response to said applied magnetic fields,

at least one chevron in each of said first and second patterns having juxtaposed leg portions thereof substantially colinear with each other and with the end of said projected pattern portion.

4,091,459
STORE COMPRISING DRIVABLE DOMAINS

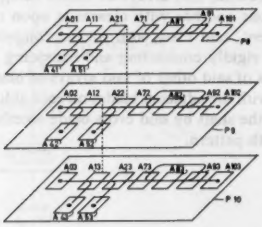
Franciscus Antonius Kuijpers; Adrianus Wilhelmus Maria van den Enden, and Antonius Henricus Albertus Maria Roovers, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 522,051, Nov. 8, 1974, abandoned. This application Jun. 2, 1976, Ser. No. 692,056

Claims priority, application Netherlands, Nov. 26, 1973, 7316107; Mar. 25, 1974, 7403967

Int. Cl.[2] G11C 19/08

U.S. Cl. 365—13 11 Claims



1. A magnetic domain storage device, comprising

at least two plates of magnetic material capable of maintaining magnetic domains therein;

a domain guide structure in each of said plates for guiding the transport of said magnetic domains therein, comprising a plurality of discrete elements, including an input structure, a storage structure, a domain generating device connected to said input structure, a domain destruction device, and a domain detecting device; said input structure including at least two series-connected diverging switches for altering the path of said magnetic domains along the guide structure of that plate, the corresponding respective switches in respective plates being shifted with respect to each other, defining predetermined time-dependent operations specific for each plate for providing selective storage of information.

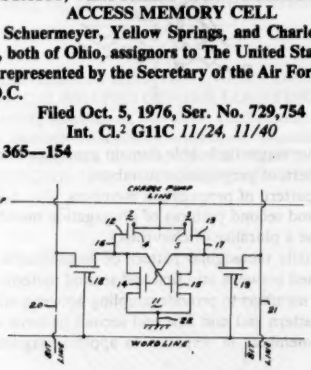
4,091,460
QUASI STATIC, VIRTUALLY NONVOLATILE RANDOM ACCESS MEMORY CELL

Fritz L. Schuermeyer, Yellow Springs, and Charles R. Young, Xenia, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Oct. 5, 1976, Ser. No. 729,754

Int. Cl.[2] G11C 11/24, 11/40

U.S. Cl. 365—154 1 Claim



1. A nonvolatile information storage cell for a storage system having a charge pump line, a bit line, a bit line, and a word line, said cell comprising:

a. a flip-flop including a first and a second metal oxide semiconductor field effect transistors having a respective first load line and a respective second load line;

b. a first metal-nitride-oxide-semiconductor nonvolatile charge injection device having a field plate and a diffusion connection, the said diffusion connection connected to the said first load line;

c. a second metal-nitride-oxide-semiconductor nonvolatile charge injection device having a field plate and a diffusion connection, the said diffusion connection connected to the said second load line;

d. means for connecting the said field plate of the said first nonvolatile charge injection device and the said field plate of the said second nonvolatile charge injection device to the said charge pump line;

e. a first access metal oxide semiconductor field effect transistor cooperating with the said word line, the said bit line, and the said first load line;

f. a second access metal oxide semiconductor field effect transistor, cooperating with the said word line, the said bit line, and the said second load line; and

g. means including the said first and second access transistors to provide an input/output to the said storage cell.

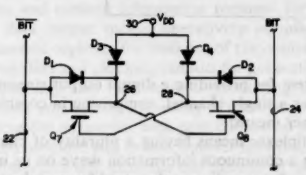
4,091,461
HIGH-SPEED MEMORY CELL WITH DUAL PURPOSE DATA BUS

Robert K. Booher, Mission Viejo, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Feb. 9, 1976, Ser. No. 656,776

Int. Cl.[2] G11C 7/00, 11/40

U.S. Cl. 365—154 13 Claims



1. A memory cell comprising a flip-flop having first and second data bus line means by which to read and write cell data, said memory cell including:

first and second data node means for receiving and storing memory cell data,

first and second multi-terminal semiconductor coupling devices, each of said coupling devices having a pair of conduction path terminals respectively connected between one of said data node means and a corresponding one of said first and second data bus line means, and

first unidirectional current conducting means respectively connected across the conduction path terminals of each of said first and second coupling devices.

12. A high-speed memory cell array comprising:

a plurality of memory cell means having at least two modes of operation, each of said memory cell means including respective data node means to receive an information signal and address terminal means connected to said data node means,

reference potential source means,

bus line means connected to said memory cell means data node means,

first transistor means enabled during a first time interval to simultaneously connect each of said bus line means to said reference potential source means during a static mode of operation whereby the logical condition of the information signal of each of said memory cell means data node means is refreshed and second transistor means enabled during a second time interval to connect the data node means of a selected one of said plurality of memory cell means to said bus line means during a dynamic mode of operation for reading or writing the logical condition of the information signal of said selected memory cell means,

control circuitry connected to control electrodes of each of

said first and second transistor means to regulate the conductivity thereof, said control circuitry also connected to provide power to the respective address terminal means of each of said plurality of memory cell means during the static mode of operation and to the selected one of said memory cell means during the dynamic mode of operation, wherein said control circuitry also includes timing means to simultaneously regulate the conductivity of said first and second transistor means during said first and second time intervals,

the control electrodes of said first and second transistor means receiving respective control signals that are inverted with respect to one another.

4,091,462

CONTROL APPARATUS FOR MORTAR COMPOUNDING APPARATUS

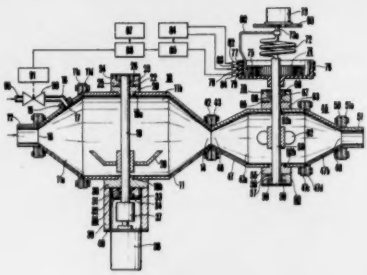
Isaburo Igarashi, Mishima; Kazuriki Iizuka, Morioka, and Hiroshi Otsuka, Yokohama, all of Japan, assignors to Toto Electric Industry Co. and Japanese National Railway, both of Tokyo, Japan

Filed Sep. 7, 1976, Ser. No. 720,825

Claims priority, application Japan, Sep. 23, 1975, 50-114315

Int. Cl.² B28C 7/12

U.S. Cl. 366—17 **5 Claims**



1. In a mortar compounding apparatus of the type wherein water and solid ingredients of mortar are admitted into a mixing tank at a predetermined ratio and admixed to form mortar and a detection tank which is coupled to the output port of said mixing tank so as to contain compounded mortar, the improvement which comprises a control appraratus comprising:

detection blades provided in said detecting tank;

a constant torque motor for rotating said blade via a coil spring;

means for detecting the load imposed upon said detection blades by said mortar, said detecting means comprising:

an annular potentiometer having a sliding arm connected to a shaft of said constant torque motor, said annular potentiometer being mounted on the bottom of a cup shaped support secured to a shaft for supporting said detection blades; and

means for deriving out a fractional voltage produced by the relative rotation of said potentiometer and said sliding arm, said deriving means comprising a plurality of slip rings mounted on the periphery of said cup shaped support for supplying a constant voltage across said potentiometer and for deriving out said fractional voltage proportional to the relative angular movement of said potentiometer and said sliding arm; and

a control device controlled by said detecting means for controlling the quantity of at least one of said water and solid ingredients supplied to said mixing tank.

4,091,463

MIXER, ESPECIALLY PRINTING INK MIXER

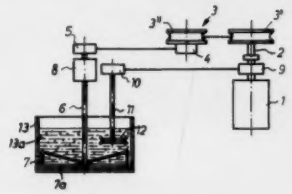
Roland Tschudy, Oberuzwil, and Eduard Schiess, Gossau, both of Switzerland, assignors to Gebruder Buhler AG, Switzerland

Filed Sep. 21, 1976, Ser. No. 725,290

Claims priority, application Switzerland, Sep. 25, 1975, 12452/75

Int. Cl.² B01F 7/16

U.S. Cl. 366—298 **4 Claims**



1. A vat mixer for admixing liquid and powder components for the production of printing ink, comprising a vat having an inner wall, a mixing tool shaft rotatably mounted so as to extend centrally downwardly into said vat, a mixing tool affixed to said mixing tool shaft for rotation therewith and having a periphery disposed in close proximity to said inner wall during the rotation, a dissolver disk shaft rotatably mounted so as to extend downwardly into said vat to one side of said mixing tool shaft, a dissolver disk affixed to said dissolver disk shaft for rotation therewith at a location in said vat to one side of said mixing tool shaft and above said mixing tool, a common drive motor for said mixing tool shaft and said dissolver disk shaft having a motor drive shaft, a clutch between only said motor drive shaft and said dissolver disk shaft for selectively connecting and disconnecting only said dissolver disk shaft, and transmission means between said dissolver disk shaft and said mixing tool shaft and said motor drive shaft for driving at least one of said dissolver disk and mixing tool shafts at variable speeds.

DESIGN PATENTS

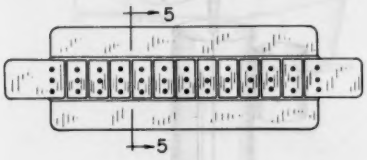
GRANTED MAY 23, 1978

ERRATA

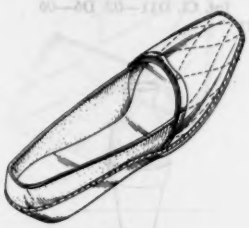
For CLASS	See PATENT NO.
D23–094	247,947
D22–028	247,976
D04–004	247,987

MAY 23, 1978

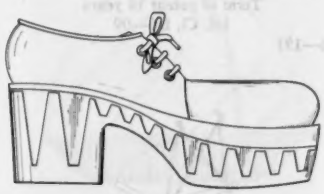
247,931
FOREHEAD CUSHION FOR FACE PROTECTIVE DEVICES
Kenneth D. Naysmith, 29782 Bayview, Grosse Ile, Mich. 48138
Filed Aug. 2, 1976, Ser. No. 710,399
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—261



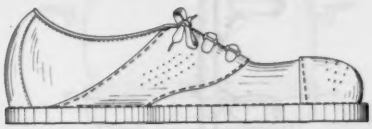
247,932
FOOTWEAR WITH POCKET TOP
Marcella M. Katz, 10573 Le Conte Ave., Los Angeles, Calif. 90024, assignor to Marcella M. Katz, Los Angeles, Calif.
Filed May 26, 1976, Ser. No. 690,351
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—265



247,933
SHOE
Victor F. Anderson, Wenonah, N.J., assignor to Shell Oil Company, Houston, Tex.
Filed Jun. 7, 1976, Ser. No. 693,381
Term of patent 3½ years
Int. Cl. D2—*04*
U.S. Cl. D2—285



247,934
SHOE
Victor F. Anderson, Wenonah, N.J., assignor to Shell Oil Company, Houston, Tex.
Filed Apr. 12, 1974, Ser. No. 676,174
Term of patent 3½ years
Int. Cl. D2—*04*
U.S. Cl. D2—287

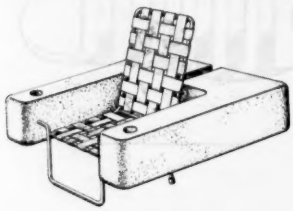


247,935
SOLE
Ladislav Sebestik, 8, rue de Saverne, Lorraine, Quebec, Canada
Filed May 3, 1976, Ser. No. 682,726
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—320

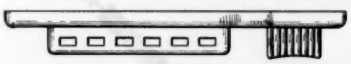
247,936
FIREARM BARREL SCRUBBER
Austin M. Wortley, Jr., Downingtown, Pa., and Bruce H. MacLeod, Monson, Mass., assignors to Penguin Industries, Inc., Parkesburg, Pa.
Filed Apr. 29, 1975, Ser. No. 572,728
Term of patent 14 years
Int. Cl. D4—*01*; D7—*05*
U.S. Cl. D4—09

247,937
ROTARY STAND FOR POTTED PLANTS
Richard D. Dilyard, 2317 Smithville-Western Dr., Wooster, Ohio 44691
Filed May 10, 1976, Ser. No. 685,083
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—24

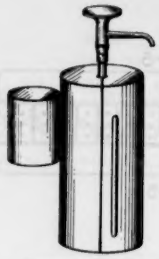
247,938
FLOATABLE LOUNGE CHAIR OR SIMILAR ARTICLE
Armand T. Rankin, 1614 Hedden Ct., New Albany, Ind. 47150
Continuation-in-part of Ser. No. 650,138, Jan. 19, 1976. This application Jun. 18, 1976, Ser. No. 692,601
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—38



247,939
TOOTH BRUSH HOLDER
Stephen H. Warhaftig, 15 Avon Rd., New Rochelle, N.Y. 10804
Filed Mar. 24, 1976, Ser. No. 669,823
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—94



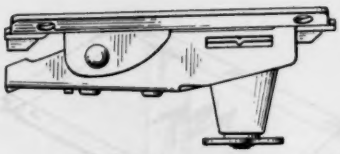
247,940
COMBINED LIQUID DISPENSER, CONTAINER SHROUD AND CUPHOLDER
William J. Tobin, New York, N.Y., assignor to Cal Industries, Inc., New York, N.Y.
Filed Apr. 7, 1976, Ser. No. 674,389
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—95



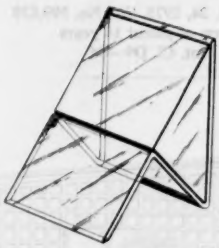
247,941
COMBINED VASE AND MOUNTING BRACKET THEREFOR
Frank J. Gregorius, 756 Westmont Rd., Santa Barbara, Calif. 93108
Filed Apr. 15, 1977, Ser. No. 787,901
Term of patent 14 years
Int. Cl. D11—*02*; D6—*06*
U.S. Cl. D6—137

247,942
ATTACHABLE SUPPORT BRACKET FOR THE ENDS OF HORIZONTAL SHELVES
John A. Gale, P.O. Box 408, Wayzata, Minn. 55391
Filed Dec. 31, 1975, Ser. No. 645,923
Term of patent 14 years
Int. Cl. D6—*09*
U.S. Cl. D6—191

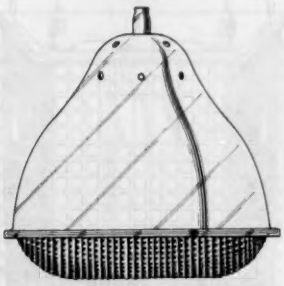
247,943
CHAIR CONTROL
Frank Doerner, 138 Aberdeen Road, Kitchener, Ontario, Canada
Filed Oct. 7, 1976, Ser. No. 730,353
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—194



247,944
DISPLAY DEVICE FOR PHOTOGRAPHS AND THE LIKE
Richard Gaiti, 92 Arbor Dr., Hohokus, N.J. 07423
Filed Dec. 23, 1975, Ser. No. 643,747
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—235

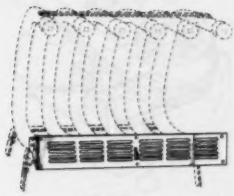


247,945
RIPENING BOWL WITH COVER
Caryl H. Saunders, 389 Riviera Dr., San Rafael, Calif. 94901
Filed Oct. 8, 1976, Ser. No. 731,041
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—17

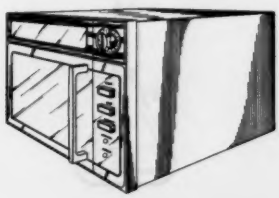


247,946
ELECTRIC COOKING BASE AND VESSEL
David L. Painter, Glenview, Ill., and Norman C. Minsky, West Bend, Wis., assignors to Dart Industries Inc., Los Angeles, Calif.
Filed Sep. 20, 1976, Ser. No. 724,437
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—94

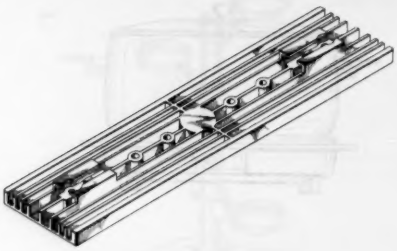
247,947
ADJUSTABLE AIR INLET MANIFOLD FOR COMBINED FIREPLACE GRATE AND HEATING UNIT
Stanley Darwin Noll, Shaker Heights, Ohio, assignor to Production Experts, Inc., Cleveland, Ohio
Filed Nov. 10, 1976, Ser. No. 740,438
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—94



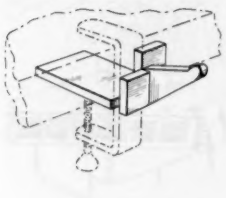
247,948
MICROWAVE OVEN
Tom Takeuchi, Mt. Prospect; Melvin H. Boldt, Glenview, and Chester J. Wojtowicz, Prospect Heights, all of Ill., assignors to Amana Refrigeration, Inc., Amana, Iowa
Filed Jan. 7, 1976, Ser. No. 647,211
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—128



247,949
MOP MOUNTING PLATE
Raymond C. Tillinghast, Memphis, Tenn., and William M. Grant, South Haven, Miss., assignors to Gem, Incorporated, Byhalia, Miss.
Filed Jan. 13, 1977, Ser. No. 763,938
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—180

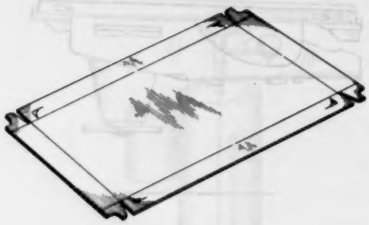


247,950
ART CADDY DRAWING DESK HOOK OR SIMILAR ARTICLE
Dallas R. Bottcher, 911 Cobblestone Dr., Lincoln, Nebr. 68510
Filed Oct. 12, 1976, Ser. No. 731,845
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—367

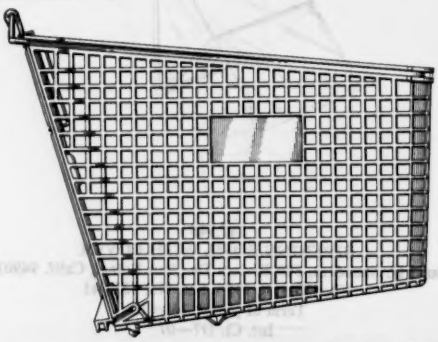


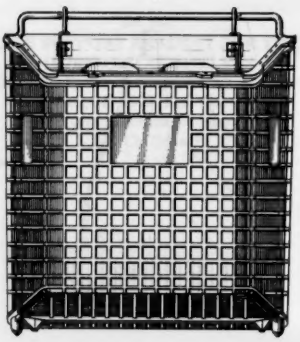
247,951
HOOK
James R. Anthony, 9045 Rosewood La., Indianapolis, Ind. 46240
Filed Oct. 12, 1976, Ser. No. 731,789
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—382

247,952
BLANK FOR A BOX COVER OR SIMILAR ARTICLE
Charles D. Donaldson, Louisville, Ky., assignor to The Mead Corporation, Dayton, Ohio
Filed Jun. 14, 1976, Ser. No. 695,576
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—245

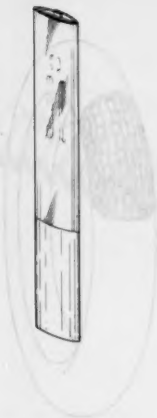


247,953
CART BASKET
Houston Rehrig, Horton Hall, 1401 S. Oak Knoll Ave., Pasadena, Calif. 91109
Filed Jul. 24, 1975, Ser. No. 599,039
Term of patent 14 years
Int. Cl. D9—*04*
U.S. Cl. D9—248





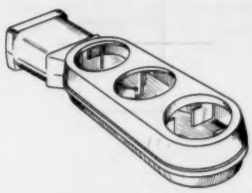
247,954
PACKAGING CONTAINER FOR A ZIPPER
James D. Mosher, Monroe, Conn.; Felix Nidzgorski, Hillside, and George R. Eckhardt, Edison, both of N.J., assignors to Coats & Clark, Inc., Stamford, Conn.
Filed Mar. 12, 1976, Ser. No. 666,211
Term of patent 14 years
Int. Cl. D9—*05*
U.S. Cl. D9—250



247,955
PACKAGING CONTAINER FOR A ZIPPER OR THE LIKE
James Mosher, Monroe, Conn.; Felix Nidzgorski, Hillside, and George Eckhardt, Edison, both of N.J., assignors to Coats & Clark, Inc., Stamford, Conn.
Continuation-in-part of Ser. No. 666,211, Mar. 12, 1976. This application Sep. 23, 1976, Ser. No. 725,965
Term of patent 14 years
Int. Cl. D9—*05*
U.S. Cl. D9—250

247,956
CLOCK
Gerald Byrne, 627 San Juan Ave., Santa Cruz, Calif. 95062
Filed Jun. 16, 1976, Ser. No. 696,758
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—10

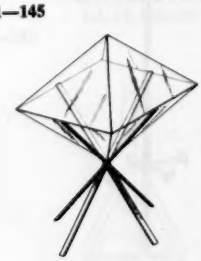
247,957
CONSOLE FOR UNDERWATER DIVING METERS
Ronald J. Adams, 12311 Kent Ct., Southgate, Mich. 48195
Filed Aug. 13, 1976, Ser. No. 714,246
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—46



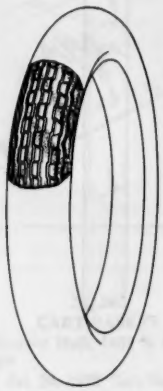
247,958
COMPASS
Tom Yates, 3712-B 53rd St., Lubbock, Tex. 79413
Filed Aug. 6, 1976, Ser. No. 712,165
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—68

247,959
PENDANT OR SIMILAR ARTICLE
Elda Krecic, New York, N.Y., assignor to Monet Jewelers, Inc., New York, N.Y.
Filed Apr. 19, 1976, Ser. No. 678,109
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—83

247,960
TERRARIUM
James L. Riedeman, 8020 Sycamore Springs Trail, Indianapolis, Ind. 46239
Filed Mar. 28, 1977, Ser. No. 781,833
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—145

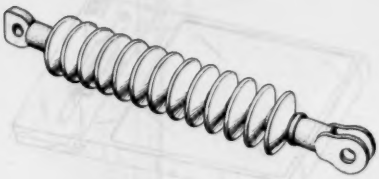


247,961
TIRE
Nobuyuki Sakaki, Kobe, Japan, assignor to Dunlop Limited, London, England
Filed Mar. 7, 1977, Ser. No. 775,113
Claims priority, application Japan, Sep. 7, 1976, 51-35352
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—142

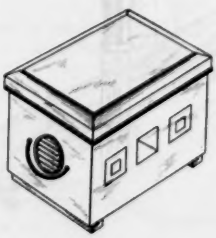


247,962
VEHICLE LICENSE SUPPORT
William F. Hunter, 5168 Salem Hills La., Cincinnati, Ohio 45230
Filed Sep. 3, 1976, Ser. No. 720,233
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—193

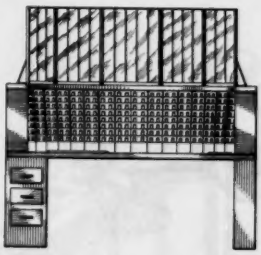
247,963
INSULATOR ASSEMBLY
Paul E. Lewis, Mexico, Mo., assignor to A. B. Chance Company, Centralia, Mo.
Filed Jun. 7, 1976, Ser. No. 693,292
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—18



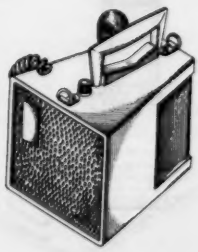
247,964
CONTROL CONSOLE FOR SWIMMING POOL GUARD SYSTEM
Gordon G. Thornley, 3333 N. Gulf Shore Dr., Naples, Fla. 33940
Filed May 27, 1976, Ser. No. 690,550
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—32



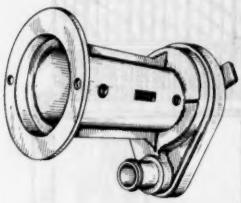
247,965
TELEPHONE ANSWERING SERVICE CONSOLE
Steven M. Gray, 625 Biltmore Way, Apt. 1403, Coral Gables, Fla. 33134
Filed May 10, 1976, Ser. No. 685,070
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—52



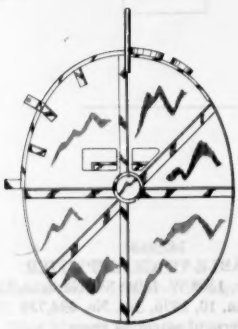
247,966
PORTABLE VOICE AMPLIFIER
George Jerome Sieler, 1308 W. 130th St., Gardena, Calif. 90247
Filed Jun. 10, 1976, Ser. No. 694,739
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—32

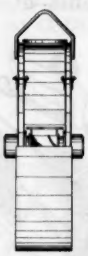


247,967
CENTRIFUGAL PUMP
Edward A. Hartnett, 219 Lakeview Dr., Mason City, Cerro Gordo County, Iowa 50401
Filed Jan. 27, 1977, Ser. No. 762,880
Term of patent 14 years
Int. Cl. D15—*02*
U.S. Cl. D15—7

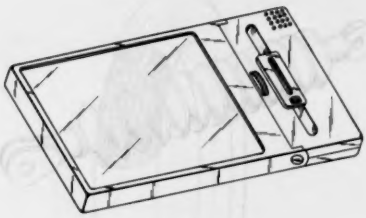


247,968
ROTATING HORSEHEAD FOR OILFIELD PUMP
Forrest E. Chancellor, P.O. Box 5578, Bakersfield, Calif. 93308
Filed Apr. 15, 1977, Ser. No. 788,073
Term of patent 14 years
Int. Cl. D15—*02*
U.S. Cl. D15—7





247,969
MICROFILM READER OR THE LIKE
Richard Joseph Olson, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Mar. 24, 1977, Ser. No. 780,871
Term of patent 14 years
Int. Cl. D16—*03*
U.S. Cl. D16—18



247,970
COMBINED HUNTING KNIFE AND SHEATH, OR SIMILAR ARTICLE
Olle Nordlund, Mjolby, Sweden, assignor to E. J. Erikssons Knivfabrik, Mora, Sweden
Filed Jun. 7, 1976, Ser. No. 693,501
Claims priority, application Sweden, Dec. 11, 1975, 752467
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—1

247,971

FISH HOOK REMOVAL TOOL

Eugene Turner, 1444 Pasadena Ave., South, St. Petersburg, Fla. 33707

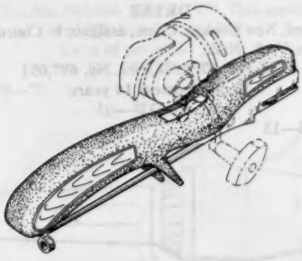
Filed Aug. 5, 1976, Ser. No. 712,311
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—31

247,972

COLLAPSIBLE FISHING ROD

Gary B. Ader, Spirit Lake, Iowa, assignor to Berkley & Company, Inc., Spirit Lake, Iowa

Filed Dec. 13, 1976, Ser. No. 749,710
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—23

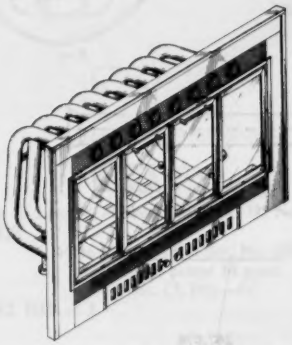


247,973

COMBINED FIREPLACE FRONT AND HEAT EXCHANGE GRATE

Theodore R. Bergstrom, St. Paul, Minn., assignor to Thermograte, Inc.

Filed Feb. 3, 1977, Ser. No. 765,410
Term of patent 14 years
Int. Cl. D23—*03;* D7—*08*
U.S. Cl. D23—94

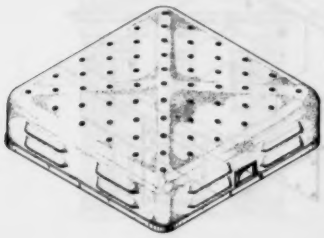


247,974

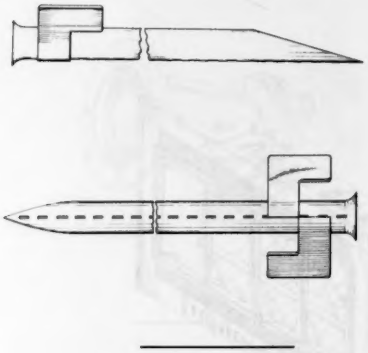
DEHUMIDIFIER

Jack I. Wheeler, 7855 S. 114th, Seattle, Wash. 98178

Filed Apr. 19, 1976, Ser. No. 678,192
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—146

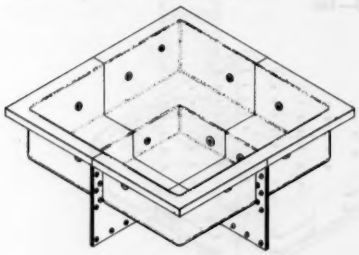


247,975
CATHETERIZATION NEEDLE
Ronald B. Luther, 1737 Bayport Way, Newport Beach, Calif. 92663
Filed Jul. 30, 1976, Ser. No. 710,336
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—25

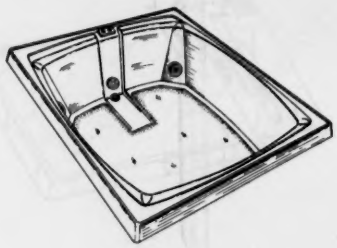


247,976
FISHING LURE
William D. Storm, P.O. Box 305, Norman, Okla. 73069
Filed Jul. 26, 1976, Ser. No. 708,376
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—28

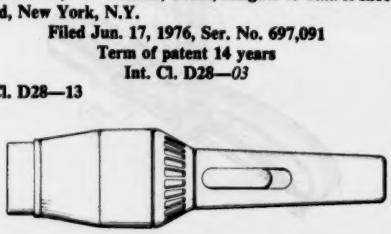
247,977
HYDROMASSAGE TUB
Roy A. Jacuzzi, 3793 Granada, Moraga, Calif. 94556
Filed Oct. 13, 1976, Ser. No. 731,984
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—38



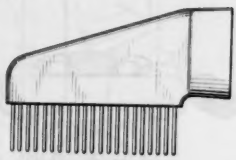
247,978
HYDROMASSAGE TUB
Ralph D'Innocente, Pleasant Hill, Calif., assignor to Jacuzzi Whirlpool Bath, Inc.
Filed Dec. 9, 1976, Ser. No. 749,028
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—55

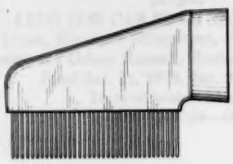


247,979
DRYER
John Wistrand, New Canaan, Conn., assignor to Clairol Incorporated, New York, N.Y.
Filed Jun. 17, 1976, Ser. No. 697,091
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—13

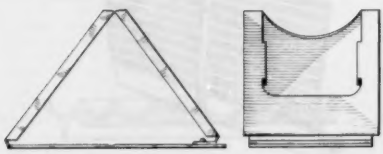


247,980
DRYER COMB CONCENTRATOR ATTACHMENT
John Wistrand, New Canaan, Conn., assignor to Clairol Incorporated, New York, N.Y.
Division of Ser. No. 697,091, Jun. 17, 1976. This application Aug. 29, 1977, Ser. No. 828,586
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—18



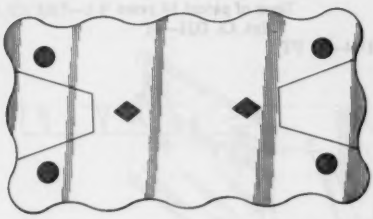


247,981
DRYER STAND
John Wistrand, New Canaan, Conn., assignor to Clairol Incorporated, New York, N.Y.
Division of Ser. No. 680,001, Aug. 8, 1975. This application Aug. 8, 1977, Ser. No. 822,755
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—73

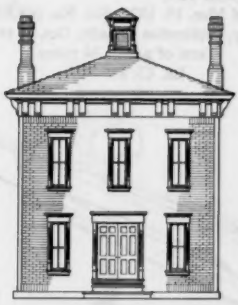


247,982
INHALATION MASK
Robert A. Huddy, 1044 Balboa Dr., Arcadia, Calif. 91006
Filed Sep. 10, 1976, Ser. No. 722,326
Term of patent 14 years
Int. Cl. D29—*02*; D24—*02*
U.S. Cl. D29—8

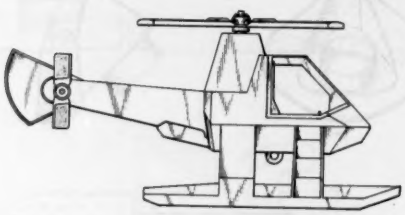
247,983
GAME TABLE TOP
Harry S. Lee, 78 Michael Rd., Apt. H, New London, Conn. 06320
Filed Nov. 5, 1975, Ser. No. 629,047
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 J



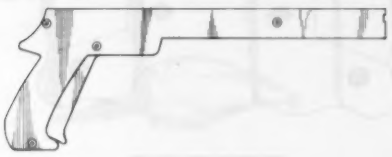
247,984
DOLL HOUSE
Robert R. Lunde, Libertyville, Ill., assignor to Magnuson Models Inc., Lake Villa, Ill.
Filed Dec. 8, 1975, Ser. No. 638,523
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 LL



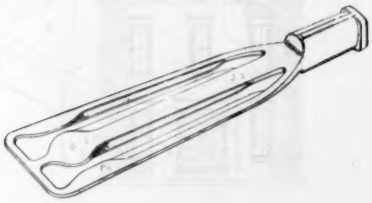
247,985
TOY HELICOPTER
Jack L. Breneman, Orchard Park, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Dec. 29, 1975, Ser. No. 644,426
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 KK



247,986
RUBBER BAND GUN
Elden Clyde, 1076 W. Foxglove Dr., Salt Lake City, Utah 84107
Filed Mar. 18, 1976, Ser. No. 668,146
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 PT

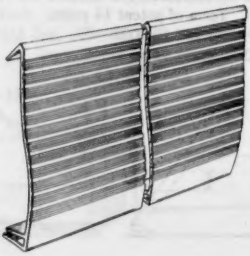


247,987
SPRING MEMBER FOR USE IN CURLING BROOMS
Albert Norman Thompson, 580A Dobbie Ave., Winnipeg, Manitoba, Canada (R2K 1G4)
Filed Mar. 19, 1976, Ser. No. 668,809
Claims priority, application Canada, Oct. 1, 1975, 0110752
Term of patent 14 years
Int. Cl. D4—*01*
U.S. Cl. D4—4

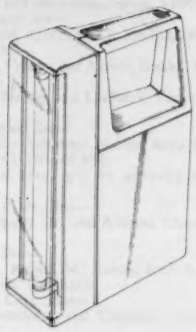


247,988
TOY TELEPHONE
Hidetomo Tomita, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Apr. 15, 1976, Ser. No. 677,128
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 C

247,989
SIDE PANEL FOR CEILING LIGHT FIXTURES
Murray M. Win, Los Angeles, Calif., assignor to Malcolite Corporation, Monterey Park, Calif.
Filed Sep. 16, 1976, Ser. No. 723,885
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—16 A

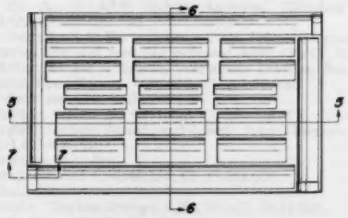


247,990
LANTERN
Chung-Chee Wong, Kowloon, Hong Kong, assignor to Sonca Industries, Limited, Kowloon, Hong Kong
Filed Jul. 19, 1976, Ser. No. 706,558
Claims priority, application United Kingdom, Jan. 29, 1976, 974196
Term of patent 14 years
Int. Cl. D26—*02*
U.S. Cl. D48—24 R

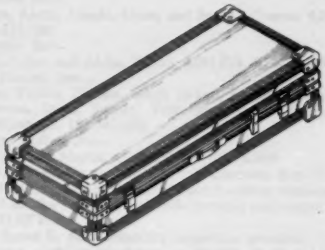


247,991
LENS FOR CAR REAR SIGNAL LIGHT
Michel Tixier, Boulogne-Billancourt, France, assignor to Regie Nationale des Usines Renault, Boulogne-Billancourt, France
Filed Jul. 21, 1975, Ser. No. 597,688
Term of patent 14 years
Int. Cl. D26—*06*
U.S. Cl. D48—32 A

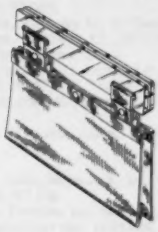
247,992
COIN HANDLING AND WRAPPING TRAY
Lester Garson, 25 Meadowhill La., Moreland Hills, Ohio 44022
Filed Dec. 17, 1975, Ser. No. 641,534
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D52—4 R



247,993
CARRYING CASE FOR A MUSICAL INSTRUMENT OR SIMILAR ARTICLE
Joseph E. Calzone, III, 28½ Bauton St., South Norwalk, Conn. 06856
Filed Jun. 25, 1976, Ser. No. 699,872
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D56—1 B



247,994
HANDBAG
Lawrence B. Schwartz, Fairfield, Conn., assignor to Acricite Company, Inc., Bridgeport, Conn.
Filed Nov. 3, 1976, Ser. No. 738,552
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—3 F



247,995
KEY RING
David P. Lage, Ballwin, Mo., assignor to Quick Point Pencil Co., Inc., Fenton, Mo.
Filed Jun. 23, 1975, Ser. No. 589,347
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—8

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 23RD DAY OF MAY, 1978

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. O. Smith Corporation: *See—*
Clark, Norman D., 4,090,290, Cl. 29-596.000.

A/S Akers Mek. Verksted: *See—*
Hoel, Eivin; and Mathiassen, Svein, 4,090,560, Cl. 166-.600.

A. Stucki Company: *See—*
Wiebe, Donald, 4,090,750, Cl. 308-138.000.

Aarnio, Jaakko: *See—*
Hamalainen, Veikko; and Aarnio, Jaakko, 4,091,056, Cl. 261-19.000.

AB Volvo: *See—*
Wedin, Sten Henrik; and Lindberg, Torsten Gunnar, 4,090,721, Cl. 280-5.00A.

Abbott Laboratories: *See—*
Tadanier, John Soloman; Martin, Jerry Roy; and Kurath, Paul, 4,091,032, Cl. 260-345.80R.

Abraham, Garnett. Hand grip for removing screwtop lids. 4,090,419, Cl. 81-3.400.

Abrams, Charlie F., Jr.: *See—*
Morrison, John E., Jr.; and Abrams, Charlie F., Jr., 4,090,456, Cl. 111-3.000.

Abrams, Martin: *See—*
Nitschneider, Robert M.; Sargis, John R.; and Abrams, Martin, 4,090,690, Cl. 254-28.000.

Acar Laminators Corp.: *See—*
Jacaruso, Salvatore; and Giuliano, Joseph A., 4,090,900, Cl. 156-85.000.

Accumulatorenwerk Hoppecke Carl Zoellner & Sohn: *See—*
Ruch, Jean; and Hasenauer, Dieter, 4,091,174, Cl. 429-27.000.

Ackers, Stephen B.; and Rose, Neil M., to Canica Crushers Ltd. Centrifugal impact rock crushers. 4,090,673, Cl. 241-275.000.

Acumeter Laboratories, Inc.: *See—*
McIntyre, Donald B.; and McIntyre, Frederic S., 4,090,520, Cl. 131-29.000.

Acushnet Company: *See—*
Porter, Raymond P., 4,090,272, Cl. 15-250.360.

Adam, Hermann: *See—*
Wanner, Karl; Paule, Kurt; Adam, Hermann; and Reibetanz, Wilbert, 4,090,297, Cl. 30-124.000.

Admiral Corporation: *See—*
Bourgeois, Jack, 4,090,274, Cl. 16-153.000.

Advani, Prem S., to Texaco Development Corporation. Morpholine process. 4,091,218, Cl. 544-106.000.

Aerazur Constructions Aeronautiques: *See—*
Derrien, Andre Robert; and Cerati, Celestin, 4,090,683, Cl. 244-151.00R.

Aero-Dyne Manufacturing, Inc.: *See—*
Stuck, Robert M., 4,090,308, Cl. 34-32.000.

Aeroquip Corporation: *See—*
Allread, Alan R.; and Levering, Kenneth A., 4,090,524, Cl. 137-68.00R.

AES Technology Systems, Inc.: *See—*
Nitschneider, Robert M.; Sargis, John R.; and Abrams, Martin, 4,090,690, Cl. 254-28.000.

Affrunti, Alfred, Jr.: *See—*
Schram, Robert A.; Affrunti, Alfred, Jr.; and Affrunti, Angela, 4,090,660, Cl. 229-43.000.

Affrunti, Angela: *See—*
Schram, Robert A.; Affrunti, Alfred, Jr.; and Affrunti, Angela, 4,090,660, Cl. 229-43.000.

Agfa-Gevaert Aktiengesellschaft: *See—*
Massengeil, Hans A., 4,090,788, Cl. 355-71.000.

Ahrel, Bo A., to ALF Societe Anonyme. Grinding apparatus. 4,090,672, Cl. 241-261.100.

Ahuja, Omprakash, to Porta Systems Corp. Telephone protector module having heat coil fired flag indicator. 4,091,435, Cl. 361-119.000.

Aiken Industries, Inc. California Instruments Division: *See—*
Muller, Peter Robert, 4,091,432, Cl. 361-56.000.

Air Products and Chemicals, Inc.: *See—*
Schwartz, Nelson N., 4,091,030, Cl. 260-326.250.
Woytek, Andrew Joseph; and Lileck, John Theodore, 4,091,081, Cl. 423-406.000.

Air Resources, Inc.: *See—*
Dowd, Edward J., 4,090,852, Cl. 23-288.00F.

Airco, Inc.: *See—*
Wechter, Stephen George, 4,090,341, Cl. 53-21.00R.

Aisin Seiki Kabushiki Kaisha: *See—*
Nakamura, Kazuaki, 4,090,815, Cl. 417-203.000.

Akahira, Nobuo: *See—*
Ohta, Takeo; Takenaga, Mutsuo; Akahira, Nobuo; Yamada, Noboru; and Yamashita, Tadaoki, 4,091,171, Cl. 428-539.000.

Akama, Kazuo, to Daido Steel Co., Ltd. Heat exchanging apparatus for industrial furnaces. 4,090,558, Cl. 165-155.000.

Akaoka, Teruhisa, to KIP Corporation. Photoconductive cadmium sulfide and process for producing same. 4,090,983, Cl. 252-501.000.

Akashi, Goro: *See—*
Kasuga, Akira; Akashi, Goro; and Suzuki, Osamu, 4,091,158, Cl. 428-216.000.

Akiba, Kunio: *See—*
Gorai, Tokio; and Akiba, Kunio, 4,091,074, Cl. 423-235.000.

Akiyoshi, Hiromi: *See—*
Honda, Toshio; Tanaka, Shoji; Iwami, Koichi; Fukuura, Yukio; Tanuma, Itsuo; Suzuki, Yoshikatsu; and Akiyoshi, Hiromi, 4,090,546, Cl. 152-347.000.

Aktiebolaget Bofors: *See—*
Nygards, Olof Martin, 4,090,450, Cl. 102-76.00P.

Albright, Larry E.; Bauer, James J.; and Cramton, Earl W., to Clark Equipment Company. Skid-steered tractor vehicle combined steering lever and auxiliary control with self-centering mechanism. 4,090,411, Cl. 74-471.0XY.

Alburger, James R. Slow-solubility inspection penetrant composition containing a solubility accelerator. 4,090,402, Cl. 73-104.000.

Aldrich, Ralph E.; Cumming, William J.; and Simmons, William A., Jr., to Itek Corporation. Mixtures of nematic liquid crystal materials. 4,090,975, Cl. 252-299.000.

Alexander, William M. Bladed wheel tractor. 4,090,570, Cl. 172-116.000.

Alexanderson, Verner; Trecek, James Bryan; and Vanderwaart, Cornelius Marsden, to American Cyanamid Company. Continuous adiabatic process for the mononitration of benzene. 4,091,042, Cl. 260-645.000.

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Ahrel, Bo A., 4,090,672, Cl. 241-261.100.

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Alff, Robert K.: *See—*
Dakin, James T.; Darrow, Kenneth A.; and Alff, Robert K., 4,090,810, Cl. 416-97.00R.

Ali, Syed Y.; and Profet, Anthony G., to Templeton, Kenly & Company. Rerailing system. 4,090,453, Cl. 104-273.000.

Allegheny Ludlum Industries, Inc.: *See—*
Lee, Douglas C.; Ziemkiewicz, Leonard P.; Ardito, Victor P.; and Greco, Alex J., 4,090,551, Cl. 164-137.000.

Allen, Edward L. Sewer drain alarm unit. 4,091,365, Cl. 340-243.000.

Allen, Henry C.: *See—*
Cucksee, Marjorie T.; and Allen, Henry C., 4,090,893, Cl. 149-19.900.

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Hoehn, Richard F.; Allen, Norman R.; and Wineburner, Ronald E., 4,090,693, Cl. 254-187.500.

Allen, Paul E., to Logic Devices, Inc. Method and apparatus for venting entrapped air in mold cavities. 4,091,069, Cl. 264-328.000.

Allen, Robert M.: *See—*
Pantiga, Gene N.; and Allen, Robert M., 4,090,928, Cl. 204-15.000.

Allied Chemical Corporation: *See—*
Nozik, Arthur J., 4,090,933, Cl. 204-129.000.

Allied Paper Incorporated: *See—*
Shaw, Michael J., 4,091,130, Cl. 427-358.000.

Allis-Chalmers Corporation: *See—*
Kepler, James L., 4,090,809, Cl. 415-163.000.
Rossi, Eugene F., 4,090,842, Cl. 432-115.000.

Allread, Alan R.; and Levering, Kenneth A., to Aeroquip Corporation. Frangible valved fitting. 4,090,524, Cl. 137-68.00R.

Almasfuzitoi Timfoldgyar: *See—*
Boros, Jozsef; Ferenczi, Tibor; Horvath, Gyula; Lazar, Ferenc; Lengyel, Laszlo; Matyasi, Jozsef; Orban nee Kelemen, Maria; Pinter, Tihamer; Sigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Bela; Voros, Istvan; Wentzely, Kalman; Zambo, Janos; and Zoldi, Jozsef, 4,091,071, Cl. 423-121.000.

Almont Manufacturing Co., Inc.: *See—*
Chyten, Norman M., 4,090,543, Cl. 150-52.00G.

Almqvist, Christer Anders Hjalmar. Means for locating plate elements in a device, such as a heat exchanger, filter, or the like. 4,090,556, Cl. 165-78.000.

Alpha Systems Corporation: *See—*
Switzgable, Harold, 4,090,940, Cl. 204-278.000.

Alpine Designs, Inc.: *See—*
Hunt, Harry E., 4,090,269, Cl. 5-343.000.

Altherr, Russell George; and Kaim, John Walter, to Amsted Industries Incorporated. Rotary type railway car coupler. 4,090,614, Cl. 213-62.00A.

Altschul, Louis T. Storable glare eliminating device. 4,090,733, Cl. 296-97.00B.

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Papafingos, Pandelis N.; and Lance, Richard T., 4,090,916, Cl. 159-9.00A.

Aluminum Pechiney: *See—*
Morel, Paul; and Dugois, Jean-Pierre, 4,090,930, Cl. 204-67.000.
Reh, Lothar; Plass, Ludolf; and Marchessaux, Philippe, 4,091,085, Cl. 423-625.000.

Aluterv Aluminiumipari Tervezo Vallalat: *See—*
Boros, Jozsef; Ferenczi, Tibor; Horvath, Gyula; Lazar, Ferenc; Lengyel, Laszlo; Matyasi, Jozsef; Orban nee Kelemen, Maria; Pinter, Tihamer; Sigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Bela; Voros, Istvan; Wentzely, Kalman; Zambo, Janos; and Zoldi, Jozsef, 4,091,071, Cl. 423-121.000.

Amato, Raymond G. Golf club shafts including vibratory means. 4,090,711, Cl. 273-80.00R.

Amberg, Ralph G.: *See—*
Amberg, Stephen W.; and Amberg, Ralph G., 4,090,905, Cl. 156-218.000.

Amberg, Stephen W.; and Amberg, Ralph G., to Owens-Illinois, Inc. Method for fabricating thermoplastic containers. 4,090,905, Cl. 156-218.000.

Ameco Corporation: *See—*
Hautau, Charles F., 4,090,281, Cl. 29-40.000.

American Can Company: *See—*
Schlesinger, Sheldon Irwin; and Boszak, Ronald J., 4,091,194, Cl. 526-24.000.

American Clearwater Corp.: *See—*
Wolfe, Henry S., 4,090,319, Cl. 43-42.190.

American Cyanamid Company: *See—*
Alexanderson, Verner; Trecek, James Bryan; and Vanderwaart, Cornelius Marsden, 4,091,042, Cl. 260-645.000.
Asato, Goro, 4,091,018, Cl. 260-562.00R.
Ashkar, Saleh Abdul-Kadir, 4,090,860, Cl. 71-78.000.
Dexter, Robin William; and Rusling, Douglas, 4,090,955, Cl. 209-5.000.
Li, Tsi Tieh; and Saxon, Robert, 4,091,002, Cl. 260-75.00S.
Panzer, Hans Peter; O'Connor, Michael Niall Desmond; and Baccei, Louis J., 4,091,224, Cl. 548-353.000.
Singh, Ajaib; and Kaizerman, Samuel, 4,090,990, Cl. 260-18.0PF.
Walworth, Bryant Leonidas, 4,091,106, Cl. 424-273.00P.
Wang, Samuel Shan-Ning; and Smith, Eugene Leroy, Jr., 4,090,972, Cl. 252-61.000.

American Electronic Laboratories, Inc.: *See—*
Pessel, Leopold, 4,091,075, Cl. 423-242.000.

American Home Products Corporation: *See—*
Strike, Donald P., 4,091,015, Cl. 260-520.00B.

American Optical Corporation: *See—*
Dragon, Martin Stephen; and Clark, Peter Parkhill, 4,090,790, Cl. 356-125.000.
Laliberte, Norman U., 4,090,830, Cl. 425-117.000.

AMP Incorporated: *See—*
Herrmann, Henry Otto, Jr., 4,090,759, Cl. 339-60.00M.

Ampex Corporation: *See—*
Hidaka, Tsuneyoshi, 4,091,330, Cl. 329-107.000.

Amsler, Joachim, to Sprecher & Schuh AG. Vacuum switch. 4,091,251, Cl. 200-146.0AA.

Amsted Industries Incorporated: *See—*
Altherr, Russell George; and Kaim, John Walter, 4,090,614, Cl. 213-62.00A.

Amster, Gerald. Apparatus for selectively transmitting television images from a plurality of cameras to a monitor. 4,091,422, Cl. 358-210.000.

Anderson, Andrew G.; Greason, William D.; and Prasan, Anantaraman R., to Ball, Willis J. Display system. 4,091,382, Cl. 340-373.000.

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Sinclair, Stuart W., 4,090,628, Cl. 214-655.000.

Anderson, Ernest L. Preformed structural panel member. 4,090,339, Cl. 52-580.000.

Anderson, Herbert W. Method and apparatus for repairing a radiator. 4,090,657, Cl. 228-119.000.

Anderson, James Kagey. Apparatus for automatically processing photogravure curvilinear surfaces. 4,090,907, Cl. 156-345.000.

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Pantridge, James Francis; and Anderson, John, 4,090,519, Cl. 128-419.00D.

Anderson, John H.; and Waters, Elmer D., to McDonnell Douglas Corporation. Heat pipe assembly. 4,090,555, Cl. 165-76.000.

Andersson, Verner; and Jonason, Hans. Electrical energy supplied heat-emitting radiator. 4,091,262, Cl. 219-345.000.

Ando, Hisashige, to Fujitsu Limited. Majority decision logic circuit. 4,091,293, Cl. 307-205.000.

Ando, Mituo: *See—*
Komiyama, Yoshiro; Kondo, Katsumi; Asano, Yoichiro; and Ando, Mituo, 4,091,245, Cl. 200-19.00R.

Andresen, Bernhard Hans: *See—*
Giolma, William Henry; and Andresen, Bernhard Hans, 4,091,335, Cl. 331-1.00A.

Andrew, Herbert Francis; Ramsay, David William Crichton; and Stead, Cecil Vivian, to Imperial Chemical Industries Limited. Azo dyestuffs. 4,091,021, Cl. 260-191.000.

Andrews, James R.: *See—*
Larsen, Ezra B.; Andrews, James R.; and Baldwin, Eugene E., 4,091,327, Cl. 324-95.000.

Angelbeck, Albert Wolcott; Vinje, Edward Wayne; Wisner, George Robert; Freeman, Ronald Harold; Reynolds, Harold C., Jr.; and Witt, Donald Lee, to United Technologies Corporation. Active laser mirror system. 4,091,274, Cl. 250-201.000.

Anisovich, Kliment Vladislavovich; and Komyak, Nikolai Ivanovich. X-ray fluorescence spectrometer. 4,091,282, Cl. 250-280.000.

Antennas for Communications, Inc.: *See—*
Hubbard, Howard H.; and Walsh, Thomas P., 4,090,834, Cl. 425-470.000.

Anthony, Thomas R.; and Cline, Harvey E., to General Electric Company. Deep diode devices and method and apparatus. 4,091,257, Cl. 219-121.0EB.

Antoine, Lucien; Leroy, Pierre; and Saleil, Jean. Process of manufacturing alloy steels in a continuously charged arc furnace. 4,090,869, Cl. 75-12.000.

Aoki, Yukio; Wakita, Shizuo; Kato, Shoichi; Tejima, Iwao; and Ishida, Shuichi, to Nippon Kayaku Kabushiki Kaisha. Diphenylether derivatives and use thereof as an acaricide. 4,091,109, Cl. 424-304.000.

Arakawa, Hideo; and Kuniya, Keiichi, to Hitachi, Ltd. Vacuum-type circuit breaker. 4,091,248, Cl. 200-144.00B.

Araki, Yoshihiko: *See—*
Horii, Hideo; Otsuki, Yutaka; Kaiya, Atsushi; and Araki, Yoshihiko, 4,091,052, Cl. 260-879.000.

Archer, John David: *See—*
Phillips, Michael James; and Archer, John David, 4,090,778, Cl. 350-96.200.

Ardito, Victor P.: *See—*
Lee, Douglas C.; Ziemkiewicz, Leonard P.; Ardito, Victor P.; and Greco, Alex J., 4,090,551, Cl. 164-137.000.

Argoudelis, Alexander D.; and Johnson, LeRoy E., to Upjohn Company, The. Process for recovering antibiotics U-50,147 and U-51,738. 4,091,201, Cl. 536-17.000.

Aries Electronics, Inc.: *See—*
Crimmins, David J., 4,090,667, Cl. 339-19.000.

Arita, Kazuo: *See—*
Takahashi, Koichi; Hitomi, Nobuteru; Kizu, Taisuke; Honchi, Hirotugu; and Arita, Kazuo, 4,090,375, Cl. 64-21.000.

Armstrong Cork Company: *See—*
Harris, Thomas G., 4,091,141, Cl. 428-290.000.

Arnold, Patrick Raymond. Gravity reading pacer. 4,090,356, Cl. 58-144.000.

Arold, Hermann, to Bayer Aktiengesellschaft. Preparation of alkylthiomethylphenols. 4,091,037, Cl. 260-609.00F.

Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
Kazihara, Akira; Ogawa, Shinsaku; Kobayashi, Takekuni; and Seko, Maomi, 4,090,932, Cl. 204-98.000.

Asano, Yoichiro: *See—*
Komiyama, Yoshiro; Kondo, Katsumi; Asano, Yoichiro; and Ando, Mituo, 4,091,245, Cl. 200-19.00R.

Asato, Goro, to American Cyanamid Company. Novel 1,2,3,4-tetrahydro-4-oxo-(-oxy-)-1-naphthylamines and method of preparation thereof. 4,091,018, Cl. 260-562.00R.

Ashkar, Saleh Abdul-Kadir, to American Cyanamid Company. Method for inhibiting bud growth of plants. 4,090,860, Cl. 71-78.000.

Ashland Oil, Inc.: *See—*
Ward, Clifford, 4,090,954, Cl. 208-206.000.

Ashworth, Thomas, Jr.: *See—*
Bronson, Wright, Jr.; Ashworth, Thomas, Jr.; Kiemer, Ralph Frederick; and Hausch, Gail William, 4,090,835, Cl. 425-505.000.

Asitrade AG: *See—*
Kramlehner, Karl, 4,090,841, Cl. 432-60.000.

Aspro, Inc.: *See—*
Kraft, Derald H., 4,090,284, Cl. 29-159.300.

Atari, Inc.: *See—*
Bristow, Stephen D., 4,091,234, Cl. 178-18.000.

Ateliers des Charmilles S.A.: *See—*
Rhyner, Heinz; Balleys, Francois; and Marendaz, Georges-Andre, 4,090,961, Cl. 219-69.00C.

Atlantic Richfield Company: *See—*
Smith, Robert H., 4,090,951, Cl. 208-91.000.

Attwell, Ronald Leslie, to London Brick Buildings Limited. Apparatus for moulding and extrusion. 4,090,827, Cl. 425-64.000.

Attwood, Terence Edwin; and Buckley, Ronald Peter, to Imperial Chemical Industries Limited. Coating compositions containing a mixture of a tetrafluoroethylene polymer an aromatic polyethersulfone. 4,090,993, Cl. 260-29.6NR.

Atzinov, Georgi Petrov: *See—*
Stoev, Stoycho Mitrev; Vuchev, Yordan Vladimirov; Kuzev, Lyubomir Vladimirov; and Atzinov, Georgi Petrov, 4,090,937, Cl. 204-180.00R.

Audeh, Costandi A.: *See—*
Bridger, Robert F.; Audeh, Costandi A.; and Heiba, El-Ahmadi I., 4,090,953, Cl. 208-177.000.

Audette, Jacques Marcel: *See—*
Chu, Pak-Jong; and Audette, Jacques Marcel, 4,091,244, Cl. 179-158.00R.

Audi NSU Auto Union Aktiengesellschaft: *See—*
Ruf, Max, 4,090,823, Cl. 418-94.000.
Ruf, Max, 4,090,824, Cl. 418-142.000.

Aurora Metal Corporation: *See—*
Smillie, John G., 4,090,995, Cl. 260-38.000.

Austin Powder Company: *See—*
Rishel, James P., 4,090,342, Cl. 53-23.000.

Australian Atomic Energy Commission: *See—*
Hunt, Frederick Charles; and Wilson, John Gerald, 4,091,088, Cl. 424-1.000.

Awazawa, Shigeru: *See—*
Nagano, Mineo; Saitoh, Michio; Awazawa, Shigeru; and Tanaka, Koji, 4,090,994, Cl. 260-31.80R.

Ayusawa, Saburo; Nagashima, Takeo; and Tsutsumi, Masaya, to Nippon Steel Corporation. Method for the manufacture of a steel sheet having excellent lubricating property. 4,091,123, Cl. 427-44.000.

B. F. Goodrich Company, The: *See—*
Krupp, Carroll Peter, 4,090,539, Cl. 141-198.000.
Rajput, Yudh Vir, 4,090,741, Cl. 303-96.000.

B 3 L: *See—*
Bourgade, Pierre, 4,090,338, Cl. 52-392.000.

B.W. Norton Manufacturing Co. Inc.: *See—*
Norton, Bernard W., 4,090,636, Cl. 220-307.000.

Baatz, Guenter Adolf. Recapping method. 4,090,901, Cl. 156-96.000.

Babasov, Mikhail Vladimirovich; Zazimko, Viktor Afanasievich; Reidemeister, Iraida Ivanovna; Semenenko, Jury Lukich; Pertsikov, Zelik Ilich; Levin, Mikhail Samuilovich; Eremeev, Valery Konstantinovich; and Varava, Leonid Mikhailovich. Device for drawings and straightening cylindrically shaped stock. 4,090,381, Cl. 72-68.000.

Babcock, Clarence O., to United States of America, Interior. Load measuring gage. 4,090,399, Cl. 73-88.00F.

Babcock & Wilcox Company, The: *See—*
Dickinson, Robert, 4,090,554, Cl. 165-1.000.
Jabsen, Felix Stanley, 4,090,917, Cl. 176-36.00R.
Keel, David LeRoy; and Waugh, Richard Allen, 4,090,881, Cl. 106-68.000.

Babiec, John S., Jr.; Nakos, Steven T.; and Goldstein, Stephen L., to Olin Corporation. Polyurethane foam preparation using pyridine ether catalysts. 4,090,988, Cl. 260-2.5AC.

Baccei, Louis J.: *See—*
Panzer, Hans Peter; O'Connor, Michael Niall Desmond; and Baccei, Louis J., 4,091,224, Cl. 548-353.000.

Bach, Jean. Method for uniform heating of a foodstuff for preservation and apparatus therefor. 4,091,119, Cl. 426-234.000.

Bagheri, Mansour A. H.; and Stillman, Donald W., to Long-Lok Fasteners Corporation. All metal self-locking screw fastener. 4,090,544, Cl. 151-14.00R.

Bagshaw, Trevor; and McCann, John, to British Steel Corporation. Applying a hard facing to an iron or steel former. 4,091,253, Cl. 219-76.140.

Baker, Don R., to Stauffer Chemical Company. Diphenyl ether amides. 4,090,865, Cl. 71-118.000.

Baker, Hugh William Barnes, to Gillette Company, The. Package and dispenser for flowable materials. 4,090,642, Cl. 222-94.000.

Bakken, Daniel Allen; Henderson, Robert Allen; and Tischler, Edward Joseph, to Ecodyne Corporation. Acid dispenser for water softener unit. 4,090,964, Cl. 210-134.000.

Baldwin, Eugene E.: *See—*
Larsen, Ezra B.; Andrews, James R.; and Baldwin, Eugene E., 4,091,327, Cl. 324-95.000.

Baldwin, John J., to Merck & Co., Inc. Substituted (3-loweralkylamino-2-R_1O-propoxy)pyridines, their preparation and use. 4,091,104, Cl. 424-263.000.

Balevski, Angel Tonchev; Nikolov, Ivan Dimov; and Nenov, Dragan Iliev, to Institute po Metaloznanie i Technologia na Metalite. Machine for molding materials with a long solidification time, such as structural foams. 4,090,837, Cl. 425-588.000.

Ball, Kenneth, to Vickers-Intertek Limited. Transit capsules. 4,090,366, Cl. 61-69.00R.

Ball, Willis J.: *See—*
Anderson, Andrew G.; Greason, William D.; and Prasan, Anantaraman R., 4,091,382, Cl. 340-373.000.

Ballantine Laboratories, Inc.: *See—*
Katzmann, Fred L.; and Gruye, Dale W., 4,090,632, Cl. 220-4.00R.

Ballentine, Earle W. Ceramic glass burner. 4,090,491, Cl. 126-39.00J.

Balleys, Francois: *See—*
Rhyner, Heinz; Balleys, Francois; and Marendaz, Georges-Andre, 4,090,961, Cl. 219-69.00C.

Balzer, Norbert R.: *See—*
Mucha, George M.; Balzer, Norbert R.; and Day, Paul L., 4,090,698, Cl. 266-133.000.

Barbin, Robert Lloyd, to RCA Corporation. Convergence apparatus for in-line beams. 4,091,347, Cl. 335-212.000.

Barden, Wayne A.: *See—*
Hufford, James N.; and Barden, Wayne A., 4,090,797, Cl. 403-157.000.

Bardenhagen, Dietrich: *See—*
Schubert, Bernhard; and Bardenhagen, Dietrich, 4,090,602, Cl. 198-377.000.

Barinaga, Pete. Fence clip tool. 4,090,390, Cl. 72-410.000.

Barker, Lynn M., to Reed Tool Company. Fracture toughness test method. 4,090,489, Cl. 125-13.00R.

Barnett, Allan E.: *See—*
Carter, James L.; and Barnett, Allan E., 4,090,980, Cl. 252-454.000.

Barraclough, Ronald; and Langley, Robert, to Ciba-Geigy Corporation. Production of phthalocyanine green. 4,091,028, Cl. 260-314.500.

Barrett, M. James; and De Graw, Joseph I., to Smith Kline Instruments, Inc. Folic acid derivatives and use in radio-assay. 4,091,087, Cl. 424-1.000.

Barrows, Robert Earl; and Pauley, Reginald William, to Ingersoll-Rand Company. Governor device. 4,090,821, Cl. 418-41.000.

Barton, Cyril: *See—*
Smith, Dale A.; and Barton, Cyril, 4,090,540, Cl. 144-34.00R.

Barton, Peter. Device for joining hollow sections. 4,090,798, Cl. 403-171.000.

Barton, Robert W., to Minnesota Mining and Manufacturing Company. Photohardenable compositions. 4,090,936, Cl. 204-159.180.

Barzman, Sidney: *See—*
Samuels, Ira; and Barzman, Sidney, 4,091,238, Cl. 179-7.10R.

BASF Aktiengesellschaft: *See—*
Hartmann, Hans Joerg; Vaeth, Guenter; and Kopke, Helmut, 4,091,143, Cl. 428-328.000.
Nottes, Guenther; Bronstert, Klaus; and Klaerner, Peter, 4,090,946, Cl. 208-48.0AA.
Sander, Bruno; Scherling, Kurt; Steinberger, Rolf; and Ropte, Eckhard, 4,091,058, Cl. 264-11.000.

Bastenhof, Dirk, to Societe d'Etudes de Machines Thermiques. Fuel injection pump with cavitation preventing steps along the fuel return flow path. 4,090,819, Cl. 417-499.000.

Bata Shoe Co., Inc.: *See—*
Hujik, Ladislav, 4,090,831, Cl. 425-119.000.

Batchelor, John Frederick; and Gorvin, John Henry, to Burroughs Wellcome Co. Antiallergic pharmaceutical composition and use. 4,091,108, Cl. 424-275.000.

Bates, Ronald Frank: *See—*
Wang, Chih Chun; Lausman, Thomas Clifford; and Bates, Ronald Frank, 4,090,758, Cl. 316-2.000.

Battelle Memorial Institute: *See—*
Fresnel, Jean-Marie; Kulhanek, Antonin; and Porta, Augusto, 4,090,927, Cl. 204-10.000.
Moore, Raymond H.; and Cox, John L., 4,090,944, Cl. 208-10.000.
Siddiqi, Iqbal; Suva, Tito; and Roehrich, Christian, 4,090,791, Cl. 356-184.000.

Baudouin, Jean-Pierre: *See—*
Souville, Pierre; and Baudouin, Jean-Pierre, 4,090,761, Cl. 339-90.00R.

Bauer, James J.: *See—*
Albright, Larry E.; Bauer, James J.; and Cramton, Earl W., 4,090,411, Cl. 74-471.0XY.

Bauer, Kurt; Brandt, Hans-Walter; and Schroter, Jurgen, to Bayer Aktiengesellschaft. Carrier-vapor distillation. 4,090,922, Cl. 203-48.000.

Bauer, Peter; Fischer, Udo; and Hosch, Ludwig, to Rohm GmbH. Infrared-reflecting glazing. 4,090,773, Cl. 350-1.600.

Baus, Heinz Georg. Partition wall for wet chambers. 4,090,265, Cl. 4-154.000.

Baxter Travenol Laboratories, Inc.: *See—*
Cammarata, Frank, III; Miller, Joe A.; and Ralston, Philip G., Jr., 4,090,541, Cl. 150-.500.
Long, Gregor Dean, 4,090,752, Cl. 312-42.000.
Macemon, James H.; and Soodak, Charles, 4,090,789, Cl. 356-85.000.

Bayer Aktiengesellschaft: *See—*
Arold, Hermann, 4,091,037, Cl. 260-609.00F.
Bauer, Kurt; Brandt, Hans-Walter; and Schroter, Jurgen, 4,090,922, Cl. 203-48.000.
Bunge, Konrad, 4,090,792, Cl. 356-188.000.
Putter, Rolf; Klag, Gunther; and Blank, Heinz Ulrich, 4,091,013, Cl. 260-508.000.
Rademachers, Jakob; Hund, Franz; Pflugmacher, Ingo; and Winter, Gerhard, 4,090,888, Cl. 106-304.000.
Thomas, Rudolf; and Lurssen, Klaus, 4,090,862, Cl. 71-98.000.

Bayhi, Joseph F., to Exxon Production Research Company. Seismic detecting means for obtaining maximum signal enhancement. 4,091,358, Cl. 340-7.00R.

BBC Brown Boveri & Company Limited: *See—*
Blank, Karl, 4,091,301, Cl. 310-270.000.
Bloch, Heinz; and Salm, Max, 4,091,450, Cl. 364-494.000.
Erismann, Oskar, 4,090,360, Cl. 60-39.290.
Klein, Hans-Peter; and Nagel, Hartmut, 4,090,892, Cl. 148-103.000.

Beacon Computer Corp.: *See—*
Samuels, Ira; and Barzman, Sidney, 4,091,238, Cl. 179-7.10R.

Beck, Jacob Howard, to BTU Engineering Corporation. Anchored coil heater. 4,091,355, Cl. 338-286.000.

Beck, James R.; and Yahner, Joseph A., to Eli Lilly and Company. Dinitroanilines for the control of phytopathogens. 4,091,096, Cl. 424-229.000.

Becker, Otto Alfred. Load bearing structural element. 4,090,340, Cl. 52-618.000.

Becker, Ralph S.; Fenstermaker, Roger W.; and Guillory, Jack P., to Phillips Petroleum Company. Determining fire retardancy. 4,090,847, Cl. 23-230.00R.

Beghin, Marcel, to Fives-Cail Babcock. Internally cooled roll. 4,090,553, Cl. 164-448.000.

Behr, Joseph Henry. Contoured work top. 4,091,155, Cl. 428-167.000.

Belcher, James E.: *See—*
Boliver, Vincent J.; and Belcher, James E., 4,090,765, Cl. 339-111.000.

Bell, Arthur Oswald; and Reardon Smith, William Antony John, to Danbury Drilling Limited; and Reardon Smith Exploration Limited. Offshore platforms. 4,090,368, Cl. 61-93.000.

Bell, George G., Sr. Traffic control director. 4,090,465, Cl. 116-63.00R.

Bell & Howell Company: *See—*
Karsh, Irving, 4,090,680, Cl. 242-195.000.
Weninger, Frank L., 4,090,785, Cl. 353-57.000.

Bell Telephone Laboratories: *See—*
Congdon, Wayne Irving; Mottine, John Joseph; and Vesperman, William Charles, 4,090,763, Cl. 339-103.00M.

Bell Telephone Laboratories, Incorporated: *See—*
Bjorklund, Gary Carl; and Freeman, Richard Reiling, 4,091,290, Cl. 307-88.300.

Chesseri, Roy Joseph; and Okinaka, Yutaka, 4,090,934, Cl. 204-140.000.
Congdon, Wayne Irving; Mottine, John Joseph; and Vesperman, William Charles, 4,090,763, Cl. 339-103.00M.
Limb, John Ormond; and Roos, Charles Edwin, 4,091,415, Cl. 358-105.000.
Lynch, William Thomas, 4,091,360, Cl. 340-166.00R.
Mizrahi, Albert; Moyer, Neal John; and Pezzutti, David August, 4,091,243, Cl. 179-84.0VF.
Plewes, John Travis, 4,090,890, Cl. 148-12.70C.

Belland, Erling Norris: *See—*
Wolnowsky, Howard Ervin; Belland, Erling Norris; and Lee, Harry Thomas, 4,091,237, Cl. 179-1.0SC.

Bengtsson, Bengt Lennart: *See—*
Bosund, Sven Ingmar Walton; Bengtsson, Bengt Lennart; and Ostman, Karl Bertil Lennart, 4,091,003, Cl. 260-112.00R.

Benini, Fernando. Optical cigarette end inspection device. 4,090,794, Cl. 356-209.000.

Benko, Pal; Simonek, Ildiko; Pallos, Laszlo; Kovacs, Jeno; and Magyar, Karoly, to Egyt Gyogyszervegyeszeti Gyar. Quinoxaline-1,4-dioxide derivatives. 4,091,206, Cl. 542-416.000.

Bennett, William Douglas, to Dunlop Limited. Method and apparatus for the recovery of vulcanized elastomeric material. 4,090,670, Cl. 241-23.000.

Benson, Phillip D. Solar heater. 4,090,498, Cl. 126-271.000.

Bentley, William Ferrel: *See—*
Luedtke, Arthur; and Bentley, William Ferrel, 4,091,386, Cl. 343-713.000.

Benzon, William, to Wilmot Engineering Co. Hydrocyclone. 4,090,956, Cl. 209-211.000.

Beppu, Yositugu: *See—*
Saito, Fumio; Yamai, Fumito; Beppu, Yositugu; and Nakayama, Shinpei, 4,091,054, Cl. 260-886.000.

Berard, Clement Alphonse, to RCA Corporation. Guard circuit for high impedance signal circuits. 4,091,430, Cl. 361-43.000.

Berbalk, Hermann, to Gebruder Boehringer Gesellschaft mit beschrankter Haftung. Tool machine for machining crank shafts. 4,090,422, Cl. 82-1.00C.

Bereiter, Wolfgang: *See—*
Gollmick, Hans-Joachim; Klinkhart, Karl; Morzinek, Herbert; Bereiter, Wolfgang; and Rosenstock, Walter, 4,090,307, Cl. 34-9.000.

Beretta, Germano: *See—*
Ferrentino, Antonio; and Beretta, Germano, 4,090,902, Cl. 156-177.000.

Berger, Dieter, to Chemische Werke Huels Aktiengesellschaft. Liquid coating compositions containing glycidyl ester-polyamine binders. 4,091,001, Cl. 260-75.0EP.

Berkman, Samuel; Kim, Kyong-Min; and Temple, Harold Edgar, to RCA Corporation. Si_3N_4 Coated crucible and die means for growing single crystalline silicon sheets. 4,090,851, Cl. 23-273.0SP.

Berlo, Florent: *See—*
Jannier, Michel; Berlo, Florent; and Bridier, Jean, 4,090,929, Cl. 204-28.000.

Berman, Alfred J. Electrical connector and method of connecting an electrical cable to same. 4,091,233, Cl. 174-88.00R.

Bernal G., Enrique; Chen, Di; Koepke, Barry G.; and Zook, James David, to Honeywell Inc. Fabrication of optical waveguides. 4,090,776, Cl. 350-96.120.

Bethlehem Steel Corporation: *See—*
Perfetti, Guido A., 4,091,131, Cl. 427-386.000.

Betta, Walter, to Wabing S.r.l. Adhering device for general rope winding up. 4,090,675, Cl. 242-47.000.

Beuther, Harold; and Montagna, Angelo A., to Gulf Research & Development Company. Process for producing benzene. 4,090,942, Cl. 208-8.000.

Bianco, Eric L. Detachable key security assembly. 4,090,380, Cl. 70-456.00R.

BICC Limited: *See—*
Parr, David Turner, 4,090,294, Cl. 29-628.000.

Biedermann, Horst H., to NCR Corporation. Printing device forms compensation and ribbon control means. 4,090,600, Cl. 400-213.000.

Bilz, Reiner, to Otto Bilz Werkzeugfabrik. Radio detector for detecting dull and broken tools. 4,090,802, Cl. 408-6.000.

Bindra, Jasjit Singh, to Pfizer Inc. Prostaglandin intermediate including oxathio heterocyclic ring. 4,091,207, Cl. 542-429.000.

Bingaman, Harold J. Automatic turnbuckle. 4,090,691, Cl. 254-51.000.

Bird Machine Company, Inc.: *See—*
Packard, Thomas D., 4,090,385, Cl. 72-191.000.

Bishopp, John H.; and Spector, George. Vandal guard sheet. 4,090,464, Cl. 116-63.00R.

Bjorklund, Gary Carl; and Freeman, Richard Reiling, to Bell Telephone Laboratories, Incorporated. Stark tuning of four-wave mixing processes. 4,091,290, Cl. 307-88.300.

Blaha, James G.; Dineen, John R.; and Wible, John E., to Towmotor Corporation. Directional control lever and horn actuating arrangement. 4,091,372, Cl. 340-282.000.

Blair, Everett George, to Wallace Murray Corporation. Temperature responsive fan drive coupling. 4,090,596, Cl. 192-58.00B.

Blair, William C., Jr., to Del Electronics Corporation. High voltage power supply with internal counterbalancing mechanism. 4,091,439, Cl. 361-334.000.

Blank, Heinz Ulrich: *See—*
Putter, Rolf; Klag, Gunther; and Blank, Heinz Ulrich, 4,091,013, Cl. 260-508.000.

Blank, Jochen; and Gluck, Gunter, to C. Terrot Soehne GmbH. & Co. Circular knitting machine. 4,090,377, Cl. 66-154.00A.

Blank, Karl, to BBC Brown Boveri & Company Limited. Rotor end-winding support for high-speed electrical machine such as a turbogenerator. 4,091,301, Cl. 310-270.000.

Blankenhorn, Paul Richard; Whiting, David Andrew; and Kline, Donald Edgar. Method of impregnating concrete. 4,091,148, Cl. 427-314.000.

Blasco, Robert: *See—*
Galmiche, Jacques; and Blasco, Robert, 4,090,659, Cl. 206-410.000.

Bloch, Heinz; and Salm, Max, to BBC Brown Boveri & Company Limited. Method and apparatus for set point control for steam temperatures for start-up of the turbine and steam generator in unit power plants. 4,091,450, Cl. 364-494.000.

Block, Aleck; and Hasegawa, Hiroshi, to Merit Abrasive Products, Inc. Flexible grinding wheel. 4,090,333, Cl. 51-336.000.

Bloomfield Industries, a Division of Beatrice Foods Co.: *See—*
Roberts, M. F., 4,090,648, Cl. 222-570.000.

Boatman, Robert L.: *See—*
Smith, Ray V.; Smith, Ray F.; Brizendine, Wesley D.; and Boatman, Robert L., 4,090,640, Cl. 222-52.000.

Bobbe, Richard M., to Xerox Corporation. Multi-color screen for electrophotographic printing. 4,090,786, Cl. 355-4.000.

Bochat, Elbert E. Process and product for fitting a brake shoe to a brake drum. 4,090,285, Cl. 29-401.00F.

Bogaert, Pierre Emmanuel Eugene Jean. Opening-devices for smoke- and heat-vents. 4,090,437, Cl. 98-86.000.

Bohg, Armin; Ebert, Eckehard; and Mirbach, Erich, to International Business Machines Corporation. Silicon oxide/silicon nitride mask with improved integrity for semiconductor fabrication. 4,091,169, Cl. 428-428.000.

Boissel, Jacques: *See—*
Fischer, Nicolas; Boissel, Jacques; Kemp, Thomas; and Eyer, Henri, 4,091,197, Cl. 526-91.000.

Bolanos, Jaime: *See—*
Pollock, Douglas; Sobarzo, Omar; Urquizar, Rolando; Vilches, Carlos; and Bolanos, Jaime, 4,090,870, Cl. 75-74.000.

Boliver, Vincent J.; and Belcher, James E., to General Electric Company. Electric cable separable connector module having a sliding segment gate gas-trap valve. 4,090,765, Cl. 339-111.000.

Bollman, Clifford J. Unitary, composite, multi-layer work area. 4,090,537, Cl. 140-92.100.

Bollmer, Jacob A., to Dayco Corporation. Printing blanket holding bar gage. 4,090,302, Cl. 33-168.00B.

Bolshikh, Artemy Stepanovich: *See—*
Kharitonov, Ivan Ivanovich; and Bolshikh, Artemy Stepanovich, 4,090,393, Cl. 73-1.00B.

Bolton, Theodore S.: *See—*
Lang, Richard D.; and Bolton, Theodore S., 4,090,373, Cl. 62-262.000.

Bon, Charles K., to Dow Chemical Company, The. Method to determine the suitability of diaphragm for use in an electrolytic cell. 4,090,924, Cl. 204-1.00T.

Bonne, Ulrich; and Tobias, James R., to Honeywell Inc. Fan control for forced air temperature conditioning apparatus. 4,090,663, Cl. 236-10.000.

Booher, Robert K., to Rockwell International Corporation. High-speed memory cell with dual purpose data bus. 4,091,461, Cl. 365-154.000.

Booth, Eugene E.: *See—*
Smith, Jonathan; Larko, Robert C.; and Booth, Eugene E., 4,090,622, Cl. 214-18.00K.

Bopp, Robert D.; and Klosterman, David P., to Orscheln Brake Lever Mfg. Co. Tilt-cab locking means. 4,090,731, Cl. 296-28.00C.

Borisch, Donald James: *See—*
Stone, Kirby Lee; and Borisch, Donald James, 4,090,695, Cl. 366-76.000.

Boros, Jozsef; Ferenczi, Tibor; Horvath, Gyula; Lazar, Ferenc; Lengyel, Laszlo; Matyasi, Jozsef; Orban nee Kelemen, Maria; Pinter, Tihamer; Sigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Bela; Voros, Istvan; Wentzely, Kalman; Zambo, Janos; and Zoldi, Jozsef, to Femipari Kutato Intezet; Aluterv Aluminiumipari Tervezo Vallalat; and Almasfuzitoi Timfoldgyar. Process for digesting goethite-containing bauxites according to the Bayer technology. 4,091,071, Cl. 423-121.000.

Borowicz, Joseph J.: *See—*
Buhr, George A.; Borowicz, Joseph J.; and McKinnon, Donald C., 4,090,766, Cl. 339-113.00L.

Borst, Walter L.; Miller, Stephen K.; and Kane, Michael B., to Southern Illinois University Foundation. Solar collector. 4,090,494, Cl. 126-270.000.

Bose, Arun C.: *See—*
Buckholtz, Harry E.; and Bose, Arun C., 4,091,031, Cl. 260-327.00P.

Boshinski, Edwin E.: *See—*
Meckstroth, Robert C.; and Boshinski, Edwin E., 4,091,449, Cl. 364-466.000.

Bossert Manufacturing Corporation: *See—*
Mount, Wadsworth W., 4,090,462, Cl. 114-293.000.

Bosund, Sven Ingmar Walton; Bengtsson, Bengt Lennart; and Ostman, Karl Bertil Lennart, to Societe d'Assistance Technique Pour Produits Nestle S.A. Fish protein isolate. 4,091,003, Cl. 260-112.00R.

Boszak, Ronald J.: *See—*
Schlesinger, Sheldon Irwin; and Boszak, Ronald J., 4,091,194, Cl. 526-24.000.

Bourgade, Pierre, to B 3 L. Parquet floor elements and parquet floor composed of such elements. 4,090,338, Cl. 52-392.000.

Bourgeois, Jack, to Admiral Corporation. Gravity door closer. 4,090,274, Cl. 16-153.000.

Bourgeois, Louis: *See—*
Nicolas, Edgard; and Bourgeois, Louis, 4,090,939, Cl. 204-258.000.

Bourque, Robert F. External combustion power cycle and engine with combustion air preheating. 4,090,362, Cl. 60-679.000.

Bouzard, Daniel; and Weber, Abraham, to Bristol-Myers Company. 7-D-α-Amino-α-(p-acetoxyphenyl)acetamido-3-methyl-3-cephem-4-carboxylic acid. 4,091,215, Cl. 544-30.000.

Bradley, James G.; and Wrhen, Wilmer C., to United States Steel Corporation. Gauge for aligning the mold of a continuous-casting machine with a guide roll-rack. 4,090,304, Cl. 33-182.000.

Bradshaw, Janice: *See—*
Cook, Martin Christopher; Gregory, Gordan Ian; and Bradshaw, Janice, 4,091,209, Cl. 544-16.000.

Bragg, James R.: *See—*
Deans, Harry A.; and Bragg, James R., 4,090,398, Cl. 73-19.000.

Braid, Milton, to Mobil Oil Corporation. Antioxidant compositions. 4,090,970, Cl. 252-42.700.

Brake Systems, Inc.: *See—*
Bray, Robert J., 4,090,738, Cl. 303-7.000.

Brandt, Hans-Walter: *See—*
Bauer, Kurt; Brandt, Hans-Walter; and Schroter, Jurgen, 4,090,922, Cl. 203-48.000.

Branscome, Kenneth M., to Datotek, Inc. Synchronous digital data scrambling system. 4,091,423, Cl. 358-259.000.

Braukmann Armaturen A.G.: *See—*
Braukmann, Bernhard W., 4,090,962, Cl. 210-108.000.

Braukmann, Bernhard W., to Braukmann Armaturen A.G. Reverse flushing filter device. 4,090,962, Cl. 210-108.000.

Bray, Robert J., to Brake Systems, Inc. Braking system for tractor-trailer combinations. 4,090,738, Cl. 303-7.000.

Bredfeldt, Karin Else; Champ, Robert Bruce; and Fowler, Karl John, to International Business Machines Corporation. Electrochromic display devices comprising thienylidene pyrazoline compounds. 4,090,782, Cl. 350-357.000.

Breuer, Hermann; and Treuner, Uwe D., to E. R. Squibb & Sons, Inc. Hydrazinocarbonylamino cephalosporins 3-heterocyclicthio 7-hydrazinocarbonylamino acetylamino cephalosporins. 4,091,212, Cl. 544-27.000.

Bridger, Robert F.; Audeh, Costandi A.; and Heiba, El-Ahmadi I., to Mobil Oil Corporation. Process for upgrading lubricating oil stock. 4,090,953, Cl. 208-177.000.

Bridgestone Tire Company Limited: *See—*
Honda, Toshio; Tanaka, Shoji; Iwami, Koichi; Fukuura, Yukio; Tanuma, Itsuo; Suzuki, Yoshikatsu; and Akiyoshi, Hiromi, 4,090,546, Cl. 152-347.000.

Bridier, Jean: *See—*
Jannier, Michel; Berlo, Florent; and Bridier, Jean, 4,090,929, Cl. 204-28.000.

Brieaddy, Lawrence Edward: *See—*
Mehta, Nariman Bomanshaw; and Brieaddy, Lawrence Edward, 4,091,100, Cl. 424-250.000.

Briggs & Stratton Corporation: *See—*
Harkness, Joseph R., 4,090,345, Cl. 56-10.500.

Bristol-Myers Company: *See—*
Bouzard, Daniel; and Weber, Abraham, 4,091,215, Cl. 544-30.000.
Kaplan, Murray A.; Gottstein, William J.; and Granatek, Alphonse P., 4,091,213, Cl. 544-27.000.

Bristow, Stephen D., to Atari, Inc. Joystick with attached circuit elements. 4,091,234, Cl. 178-18.000.

British Steel Corporation: *See—*
Bagshaw, Trevor; and McCann, John, 4,091,253, Cl. 219-76.140.
Carter, George A.; and Young, Reginald S., 4,091,060, Cl. 264-40.100.

Brizendine, Wesley D.: *See—*
Smith, Ray V.; Smith, Ray F.; Brizendine, Wesley D.; and Boatman, Robert L., 4,090,640, Cl. 222-52.000.

Bronson, Wright, Jr.; Ashworth, Thomas, Jr.; Kiemer, Ralph Frederick; and Hausch, Gail William, to Steelastic Company, The. Apparatus for applying an elastomeric edge to a sheet of elastomeric fabric. 4,090,835, Cl. 425-505.000.

Bronstert, Klaus: *See—*
Nottes, Guenther; Bronstert, Klaus; and Klaerner, Peter, 4,090,946, Cl. 208-48.0AA.

Brown, Asa V., Jr.; and Suttles, James Marshall, to Hopeman Brothers, Inc. Display with movable indicia. 4,090,315, Cl. 40-518.000.

Brown, Joseph L., Jr.; Fragomeni, Dominic; and Trageser, James J., to United States Steel Corporation. Water cooled shell for electric arc furnaces. 4,091,228, Cl. 13-32.000.

Brown, William E.: *See—*
Parker, William L.; Meyers, Edward; Nimeck, Maxwell W.; and Brown, William E., 4,091,092, Cl. 424-118.000.

Brydon, Donald Lithgow; and Tomka, Jiri George, to Imperial Chemical Industries Limited. Bonded structures. 4,091,159, Cl. 428-236.000.

BTU Engineering Corporation: *See—*
Beck, Jacob Howard, 4,091,355, Cl. 338-286.000.

Buchner, John B.: *See—*
Roszyk, Leon M.; Mammen, H. William; and Buchner, John B., 4,091,317, Cl. 318-369.000.

Buck, Francis Fremonte, to Fisher Scientific Company. Indirect latex test for determination of fibrinogen degradation products. 4,090,846, Cl. 23-230.00B.

Buckholtz, Harry E.; and Bose, Arun C., to Hooker Chemicals & Plastics Corp. Process for the manufacture of substituted thianthrene based products. 4,091,031, Cl. 260-327.00P.

Buckley, Ronald Peter: *See—*
Attwood, Terence Edwin; and Buckley, Ronald Peter, 4,090,993, Cl. 260-29.6NR.

Budd Company, The: *See—*
Dean, Albert G., 4,090,454, Cl. 105-182.00R.

Buendia, Jean; and Vivat, Michel, to Roussel Uclaf. Novel cyclopentenecarboxylates. 4,091,226, Cl. 560-122.000.

Buffington, William E., Jr. Insulating core for use as a strain insulator or a coil form. 4,091,350, Cl. 336-208.000.

Buhr, George A.; Borowicz, Joseph J.; and McKinnon, Donald C., to Fox Valley Instrument Company. Test connector adaptor. 4,090,766, Cl. 339-113.00L.

Bunge, Konrad, to Bayer Aktiengesellschaft. Single beam photometer for investigating a specimen. 4,090,792, Cl. 356-188.000.

Bunker Ramo Corporation: *See—*
Furey, Robert J., 4,090,760, Cl. 339-61.00R.
Sato, Shoichi; and Oda, Shizuo, 4,090,656, Cl. 228-180.00R.

Burcz, Lawrence D.; and Whitney, Douglas A., to Ford Motor Company. Control system for an automatic transmission with a hydrokinetic torque converter and an integral lockup clutch. 4,090,417, Cl. 74-864.000.

Burlington Industries, Inc.: *See—*
McConnell, Bobby Lee; Thornton, Raymond; and Graham, Louis Atkins, 4,091,004, Cl. 260-153.000.

Burroughs Corporation: *See—*
Caras, Bernard; and Hall, Stacy W., 4,091,304, Cl. 313-174.000.
Donofrio, Frank Carl; and DiPietro, Angelo Richard, 4,091,246, Cl. 200-50.00B.

Burroughs Wellcome Co.: *See—*
Batchelor, John Frederick; and Gorvin, John Henry, 4,091,108, Cl. 424-275.000.
Grivsky, Eugene M., 4,091,112, Cl. 424-324.000.
Mehta, Nariman Bomanshaw; and Brieaddy, Lawrence Edward, 4,091,100, Cl. 424-250.000.

Busch, Kieran; and Hoen, Cuyler, to Simmons Fastener Corporation. Half-turn actuated member. 4,090,727, Cl. 292-11.000.

Button, Martha Willis: *See—*
Johnson, Howard B., 4,090,568, Cl. 171-27.000.

C. Minuterie Metalliche S.p.A.: *See—*
Olivieri, Icaro, 4,090,278, Cl. 24-70.0SK.

C. Terrot Soehne GmbH. & Co.: *See—*
Blank, Jochen; and Gluck, Gunter, 4,090,377, Cl. 66-154.00A.

Calamani, Sergio: *See—*
Savio, Ermanno; Calamani, Sergio; and Turri, Eugenio, 4,090,677, Cl. 242-47.010.

Caldwell, Richard K.: *See—*
Simanskis, Imantas; and Caldwell, Richard K., 4,090,719, Cl. 277-125.000.

Caldwell, Thomas C.: *See—*
Dixon, William P.; Caldwell, Thomas C.; and Ilfrey, William T., 4,090,395, Cl. 73-40.50R.

Calhoun, Charles W.: *See—*
Weiner, Peter D.; Calhoun, Charles W.; Collins, Jerry A.; and Mee, Gary Lynn, 4,091,451, Cl. 364-506.000.

Cammarata, Frank, III; Miller, Joe A.; and Ralston, Philip G., Jr., to Baxter Travenol Laboratories, Inc. Flexible collapsible container. 4,090,541, Cl. 150-.500.

Campbell, James A.; and Unangst, R. Richard, to SmithKline Corporation. Multiple dose paste dispenser. 4,090,639, Cl. 222-43.000.

Canadian Patents & Development Limited: *See—*
Poling, George W.; and Rosas, Jorge E., 4,090,867, Cl. 75-2.000.

Canica Crushers Ltd.: *See—*
Ackers, Stephen B.; and Rose, Neil M., 4,090,673, Cl. 241-275.000.

Canon Kabushiki Kaisha: *See—*
Kozuki, Susumu; Sunouchi, Akio; and Watanabe, Yoshiaki, 4,091,395, Cl. 354-173.000.

Cantrell, Peter Morris: *See—*
Edwards, Ronald Alexander Nixon; Cantrell, Peter Morris; and Miller, John James, 4,091,116, Cl. 426-42.000.

Caras, Bernard; and Hall, Stacy W., to Burroughs Corporation. Gas discharge display panel with mercury capsule disposed in channeled insulating sheet. 4,091,304, Cl. 313-174.000.

Cari-All Inc.: *See—*
Trubiano, Antoine, 4,090,633, Cl. 220-6.000.

Carl Walther, Sportwaffenfabrik: *See—*
Volkmar, Willi, 4,090,316, Cl. 42-70.00F.

Carr, John B.; and Durham, Harry G., to Shell Oil Company. 3-(Benzoyl)oxiranecarboxamides. 4,091,221, Cl. 544-147.000.

Carrier Corporation: *See—*
Lang, Richard D.; and Bolton, Theodore S., 4,090,373, Cl. 62-262.000.

Carroll, Frank E., to Carroll Research, Inc. Insulated roofing structure. 4,090,336, Cl. 52-309.700.

Carroll Research, Inc.: *See—*
Carroll, Frank E., 4,090,336, Cl. 52-309.700.

Carrubba, Francis Paul; Daniels, Walter Edgar, Jr.; and Franaszek, Peter Anthony, to International Business Machines Corporation. High speed voice replay via digital delta modulation. 4,091,242, Cl. 179-15.55T.

Carter, Cecil O.: *See—*
Haskell, Donald M.; and Carter, Cecil O., 4,090,923, Cl. 203-51.000.

Carter, George A.; and Young, Reginald S., to British Steel Corporation. Balling process. 4,091,060, Cl. 264-40.100.

Carter, James L.; and Barnett, Allan E., to Exxon Research & Engineering Co. Method for preparing reduced metal catalyst having metal surface area. 4,090,980, Cl. 252-454.000.

Cassano, James R.: *See—*
Smith, Richard E.; Hamlin, Thomas J.; Stange, Klaus K.; and Cassano, James R., 4,090,704, Cl. 271-246.000.

Cassata, John R., to Olin Corporation. Process for deactivating toluene diisocyanate distillation residue. 4,091,009, Cl. 260-453.0PH.

Cassidy, James Lawrence. Precision rifle sight adjuster. 4,090,305, Cl. 33-234.000.

Catalyst Research Corporation: *See—*
Schneider, Alan Arthur, 4,090,291, Cl. 29-623.100.

Caterpillar Tractor Co.: *See—*
Gorrell, James M.; Collins, Terry R.; and Windish, Willis E., 4,090,415, Cl. 74-769.000.
Hamilton, Thomas R., 4,090,724, Cl. 280-415.00R.
Hart, Cullen P., 4,090,723, Cl. 280-6.00H.
Hoehn, Richard F.; Allen, Norman R.; and Wineburner, Ronald E., 4,090,693, Cl. 254-187.500.
Mason, Gary E., 4,090,314, Cl. 37-124.000.
Ritter, Arthur J., Jr., 4,090,545, Cl. 151-28.000.
Stedman, Robert N., 4,090,579, Cl. 180-69.00R.
Young, D. Craig, 4,090,358, Cl. 60-39.51R.

Cefilac: *See—*
Desverchere, Jean, 4,091,161, Cl. 428-288.000.

Celanese Corporation: *See—*
Tuskos, Michael E., 4,090,898, Cl. 156-73.500.

Cerati, Celestin: *See—*
Derrien, Andre Robert; and Cerati, Celestin, 4,090,683, Cl. 244-151.00R.

CGEE Alsthom S.A.: *See—*
Gelin, Claude; and Lavigne, Jean, 4,091,440, Cl. 361-415.000.

Chaitin, Horace. Skin lesion analyzer. 4,090,501, Cl. 128-2.00H.

Chall, Harold J.; and Cimperman, Frederick J., to Vistan Corporation. Combination pitter and stuffer for olives. 4,090,439, Cl. 99-494.000.

Chamberlin, Howard A.: *See—*
Scharf, Daniel J.; and Chamberlin, Howard A., 4,090,959, Cl. 210-58.000.

Chambers, D. Harry: *See—*
Dunning, Beverly W., Jr.; and Chambers, D. Harry, 4,090,935, Cl. 204-146.000.

Champ, Robert Bruce: *See—*
Bredfeldt, Karin Else; Champ, Robert Bruce; and Fowler, Karl John, 4,090,782, Cl. 350-357.000.

Chandler, William F.: *See—*
Frey, Frederick J.; and Chandler, William F., 4,090,756, Cl. 312-320.000.

Chang, Yun-Feng: *See—*
Labana, Santokh S.; and Chang, Yun-Feng, 4,091,049, Cl. 260-836.000.

Chapin, Doloria M. Spinning wheel yarn guide. 4,090,347, Cl. 57-71.000.

Chaplin, John B., to Textron Inc. Side lubricated seal device for a surface effect ship. 4,090,459, Cl. 114-67.00A.

Chavchanidze, Evgeny Kirillovich: *See—*
Golovanov, Nikolai Vasilievich; Ivanov, Vitaly Alexandrovich; Mitor, Vyacheslav Vladimirovich; Parshin, Anatoly Alexeevich; Sapozhnikov, Fedor Vasilievich; Ter-Minosian, Sergei Mikhailovich; and Chavchanidze, Evgeny Kirillovich, 4,090,473, Cl. 122-6.00A.

Chemical Additives Company: *See—*
Jackson, Jack M.; and Hartfiel, Arlynn H., 4,090,968, Cl. 252-8.50A.

Chemische Werke Huels Aktiengesellschaft: *See—*
Berger, Dieter, 4,091,001, Cl. 260-75.0EP.

Chen, Ching-Hong; Tsay, Horng-Mou; and Heyer, Robert E., to E. R. Squibb & Sons, Inc. Apparatus for use in radioimmunoassays. 4,090,850, Cl. 23-259.000.

Chen, Chun-Fu, to University of Akron, The. Automatically tunable notch filter and method for suppression of acoustical feedback. 4,091,236, Cl. 179-1.0FS.

Chen, Di: *See—*
Bernal G., Enrique; Chen, Di; Koepke, Barry G.; and Zook, James David, 4,090,776, Cl. 350-96.120.

Chen, James T. C. Cooking apparatus. 4,090,500, Cl. 126-391.000.

Chen, Mark Chaoming, to Du Pont de Nemours, E. I., and Company. Process for improving ozone and flex resistance of certain elastomers. 4,090,989, Cl. 260-5.000.

Chen, Thomas T., to Rockwell International Corporation. Bias structure to efficiently package a magnetic bubble domain device. 4,091,362, Cl. 365-1.000.

Cheng, James K. J., to GAF Corporation. Developing solutions for 2-component diazo-type materials. 4,090,879, Cl. 96-49.000.

Chesseri, Roy Joseph; and Okinaka, Yutaka, to Bell Telephone Laboratories, Incorporated. Gold plating with electrochemical passivation. 4,090,934, Cl. 204-140.000.

Chibata, Ichiro; Tosa, Tetsuya; Mori, Takao; Watanabe, Taizo; Sano, Ryujiro; and Matuo, Yuhsi, to Tanabe Seiyaku Co., Ltd. Water-insoluble tannin preparation for immobilization of proteins. 4,090,919, Cl. 195-63.000.

Chichibu, Kenji; and Wakabayashi, Kiyoshige, to Chugai Seiyaku Kabushiki Kaisha. Method for quantitative determination of an antigenic substance. 4,091,089, Cl. 424-12.000.

Chin, Clinton G.: *See—*
Micetich, Ronald G.; Chin, Clinton G.; and Morin, Robert B., 4,091,026, Cl. 260-306.70C.

Chireau, Roland F.; and Seidman, Sandor F., to Yardney Electric Corporation. Titanium/silver-containing cellulosic separator for electrochemical cells. 4,091,185, Cl. 429-144.000.

Chiriac, Ilie: *See—*
Teodorescu, Constantin; Chiriac, Ilie; Sava, Cornel Doru; Draghici, Adrian; and Zinca, Sabin, 4,090,814, Cl. 417-178.000.

Chisso Engineering Co Ltd.: *See—*
Gorai, Tokio; and Akiba, Kunio, 4,091,074, Cl. 423-235.000.

Chloride Group Limited: *See—*
Foster, George William, 4,091,320, Cl. 320-40.000.

Chow, Sen-Te, to United States of America, Army. Forward locking infrared video processing system having a scene dynamic range expander. 4,091,414, Cl. 358-174.000.

Christie, Christopher E.; and Steffey, Eddie B., to Goodyear Tire & Rubber Company, The. Tire band building drum. 4,090,909, Cl. 156-414.000.

Chrysler Corporation: *See—*
George, Robert A.; and Pogorel, John, Jr., 4,090,889, Cl. 148-11.50A.

Chu, Pak-Jong; and Audette, Jacques Marcel, to Northern Telecom Limited. Multiple contact switch. 4,091,244, Cl. 179-158.00R.

Chu, Simon Long; Golda, Eugene; and Wilkes, Alan Leonard, to Polychrome Corporation. Lithographic printing plate and method of making same. 4,090,880, Cl. 96-86.00R.

Chu, Tze Yao; and Wenger, George Michael, to Western Electric Company, Inc. Apparatus for maintaining a vapor blanket in a condensation heating facility. 4,090,843, Cl. 432-197.000.

Chugai Seiyaku Kabushiki Kaisha: *See—*
Chichibu, Kenji; and Wakabayashi, Kiyoshige, 4,091,089, Cl. 424-12.000.

Chyten, Norman M., to Almont Manufacturing Co., Inc. Tennis racket cover. 4,090,543, Cl. 150-52.00G.

Ciba-Geigy AG: *See—*
Schlesinger, Ulrich; and Ramanathan, Visvanathan, 4,091,025, Cl. 260-294.80F.

Ciba-Geigy Corporation: *See—*
Barraclough, Ronald; and Langley, Robert, 4,091,028, Cl. 260-314.500.
Falk, Robert A., 4,090,967, Cl. 252-3.000.
Francis, John E., 4,091,103, Cl. 424-258.000.
Zussman, Hyman W.; Knell, Martin; and Dexter, Martin, 4,091,223, Cl. 548-308.000.

Cichinski, Adele R. Magnetic needle threader. 4,090,649, Cl. 223-99.000.

Ciciora, Walter S., to Zenith Radio Corporation. Automatic channel equalization with time base expansion. 4,091,418, Cl. 358-160.000.

Cilia, Philip F.: *See—*
Faust, Clifford C.; and Cilia, Philip F., 4,090,374, Cl. 62-341.000.

Cimarusti, Christopher M.: *See—*
Slusarchyk, William A.; and Cimarusti, Christopher M., 4,091,216, Cl. 544-30.000.

Cimperman, Frederick J.: *See—*
Chall, Harold J.; and Cimperman, Frederick J., 4,090,439, Cl. 99-494.000.

Cincinnati Milacron Inc.: *See—*
Stone, Kirby Lee; and Borisch, Donald James, 4,090,695, Cl. 366-76.000.

Citizen Watch Co., Ltd.: *See—*
Foreman, Jay M., Jr., 4,090,351, Cl. 58-23.00D.
Nomura, Yasushi, 4,090,350, Cl. 58-23.00R.

Citta, Richard W., to Zenith Radio Corporation. Frequency and phase lock loop synchronous detecting system having a pair of phase lock conditions. 4,091,410, Cl. 358-24.000.

Cla-Val Co.: *See—*
Story, J. Albert, Jr., 4,090,532, Cl. 137-624.150.

Clark, Edward Watson, to Woolcombers Limited. Process for the production of hypoallergenic lanolin. 4,091,035, Cl. 260-397.250.

Clark Equipment Company: *See—*
Albright, Larry E.; Bauer, James J.; and Cramton, Earl W., 4,090,411, Cl. 74-471.0XY.

Clark, Norman D., to A. O. Smith Corporation. Method of making an electric motor winding insulating barrier. 4,090,290, Cl. 29-596.000.

Clark, Peter Parkhill: *See—*
Dragon, Martin Stephen; and Clark, Peter Parkhill, 4,090,790, Cl. 356-125.000.

Clausen, Edward M., to General Electric Company. Fused silica article having titania-silicate barrier zone. 4,091,163, Cl. 428-336.000.

Clausing, Martin B. Off-line, one-level/on-line, two-level timeshared automated banking system. 4,091,448, Cl. 364-200.000.

Clayfield, Eric J.; Lumb, Ernest C.; and Wilbraham, Kenneth J., to Shell Oil Company. Colloil product and method. 4,090,853, Cl. 44-51.000.

Clayton, William L.: *See—*
Serratore, Joseph; and Clayton, William L., 4,091,047, Cl. 260-836.000.

Clendenen, Frank B. Sediment collection and removal system for rectangular sedimentation basin. 4,090,966, Cl. 210-143.000.

Cline, Harvey E.: *See—*
Anthony, Thomas R.; and Cline, Harvey E., 4,091,257, Cl. 219-121.0EB.

Colgate-Palmolive Company: *See—*
Fischer, Charles F.; and Joshi, Hargovind H., 4,090,829, Cl. 425-73.000.
Karami, Hamzeh, 4,090,515, Cl. 128-284.000.
Schaar, Charles H., 4,090,516, Cl. 128-287.000.

Collins, Jerry A.: *See—*
Weiner, Peter D.; Calhoun, Charles W.; Collins, Jerry A.; and Mee, Gary Lynn, 4,091,451, Cl. 364-506.000.

Collins, Terry R.: *See*—
Gorrell, James M.; Collins, Terry R.; and Windish, Willis E., 4,090,415, Cl. 74-769.000.
Color-Plast S.p.A.: *See*—
Crotti, Giacomo; and Diolaiti, Erminio, 4,090,799, Cl. 403-401.000.
Combustion Engineering, Inc.: *See*—
McCartney, Michael Scott, 4,090,455, Cl. 110-232.000.
Combustion Unlimited Incorporated: *See*—
Straitz, John F., III, 4,090,840, Cl. 431-14.000.
Compagnie Deutsch: *See*—
Souville, Pierre; and Baudouin, Jean-Pierre, 4,090,761, Cl. 339-90.00R.
Compania de Acero del Pacifico S.A.: *See*—
Poliock, Douglas; Sobarzo, Omar; Urquizar, Rolando; Vilches, Carlos; and Bolanos, Jaime, 4,090,870, Cl. 75-74.000.
Compression Labs, Inc.: *See*—
Widergren, Robert D., 4,091,424, Cl. 358-260.000.
Compton, Sherman L. Hoop toy assembly. 4,090,324, Cl. 46-220.000.
Computer Peripherals, Inc.: *See*—
Yu, Chin C., 4,091,380, Cl. 340-347.0DD.
Computervision Corporation, The: *See*—
Friedman, David, 4,091,316, Cl. 318-696.000.
Comte, Georges: *See*—
Ormili, Bernard; and Comte, Georges, 4,090,280, Cl. 29-33.00K.
Congdon, Wayne Irving; Mottine, John Joseph; and Vesperman, William Charles, to Bell Telephone Laboratories Incorporated; and Bell Telephone Laboratories. Cordage for use in telecommunications. 4,090,763, Cl. 339-103.00M.
Connlab Holdings Limited: *See*—
Micetich, Ronald G.; Chin, Clinton G.; and Morin, Robert B., 4,091,026, Cl. 260-306.70C.
Connor Engineering & Manufacturing, Inc.: *See*—
Krisko, Michael L.; and Pare, Donald R., 4,090,434, Cl. 98-38.00E.
Continental Oil Company: *See*—
Satchell, Donald P., Jr., 4,090,947, Cl. 208-56.000.
Control Data Corporation: *See*—
Strom, Richard Albert, 4,091,309, Cl. 315-169.0TV.
Cook, Harold L., Jr.; and Geer, Ernest C., to Transco Energy Company. Method for increasing the recovery of oil and gas from a water invaded geo-pressured water drive oil reservoir. 4,090,564, Cl. 166-314.000.
Cook, Martin Christopher; Gregory, Gordan Ian; and Bradshaw, Janice, to Glaxo Laboratories Limited. 7β-[2-Etherified oximino-2-(phenyl or naphthylacetamido)]cephalosporins having a 2-haloalkylcarbamoyloxymethyl group at the 3-position. 4,091,209, Cl. 544-16.000.
Cooper, Henry E., IV: *See*—
Wilkinson, Everett R., Jr.; and Cooper, Henry E., IV, 4,090,643, Cl. 222-146.0HE.
Cooper, Herbert W., to Dynalytics Corporation. Gas energizing apparatus and related method. 4,090,960, Cl. 210-63.00Z.
Coors Container Company: *See*—
Peck, Richard O., 4,090,666, Cl. 239-15.000.
Couch, Benjamin M.: *See*—
Elmore, Richard R.; and Couch, Benjamin M., 4,091,142, Cl. 428-322.000.
Cox, John L.: *See*—
Moore, Raymond H.; and Cox, John L., 4,090,944, Cl. 208-10.000.
Cox, Samson A.: *See*—
LeVert, Francis E.; and Cox, Samson A., 4,091,288, Cl. 250-370.000.
Cragar Industries, Inc.: *See*—
Gockel, Jack L., 4,090,477, Cl. 123-1.00R.
Cragoe, Edward J., Jr.; and Jones, James H., to Merck & Co., Inc. 8-Aza-9-oxo(and dioxo)-thia-11,12-secoprostaglandins. 4,091,107, Cl. 424-274.000.
Cragoe, Edward J., Jr.: *See*—
Rokach, Joshua; Rooney, Clarence S.; Reader, Grant W.; and Cragoe, Edward J., Jr., 4,091,105, Cl. 424-270.000.
Craig, James C., Jr.; and Kozempel, Michael F., to United States of America, Agriculture. Continuous process for preparation of isopropenyl stearate. 4,091,005, Cl. 260-410.90N.
Cramton, Earl W.: *See*—
Albright, Larry E.; Bauer, James J.; and Cramton, Earl W., 4,090,411, Cl. 74-471.0XY.
Crandall, Walter Ellis, to Northrop Corporation. Traveling wave tube amplifier employing field emission cathodes. 4,091,332, Cl. 330-43.000.
Crimmins, David J., to Aries Electronics, Inc. Universally programmable shorting plug for an integrated circuit socket. 4,090,667, Cl. 339-19.000.
Crompton & Knowles Corporation: *See*—
Sassi, Enzo, 4,090,445, Cl. 101-425.000.
Crosby, Ervin L.: *See*—
Trimble, James A.; and Crosby, Ervin L., 4,090,478, Cl. 123-58.00R.
Crotti, Giacomo; and Diolaiti, Erminio, to Color-Plast S.p.A.; and Generale Ultrasuoni S.p.A. Miter joint for hollow plastic frame members. 4,090,799, Cl. 403-401.000.
Crowson, Paul Richard; and Enos, Herman Isaac, Jr., to Hercules Incorporated. Apparatus for treating trees. 4,090,326, Cl. 47-12.000.
Crowson, Paul Richard, to Hercules Incorporated. Apparatus for treating trees. 4,090,327, Cl. 47-12.000.
CTS Corporation: *See*—
Hufford, James N.; and Barden, Wayne A., 4,090,797, Cl. 403-157.000.
Cucksee, Marjorie T.; and Allen, Henry C., to United States of America, Army. Bonding agent system for improved propellant aging and low temperature physical properties. 4,090,893, Cl. 149-19.900.
Cumming, William J.: *See*—
Aldrich, Ralph E.; Cumming, William J.; and Simmons, William A., Jr., 4,090,975, Cl. 252-299.000.
Curatolo, Frank. Partition panel for subdividing a room area. 4,090,335, Cl. 52-239.000.
Currier, Edward Thomas. Steam heating system and condenser therefor. 4,090,557, Cl. 165-110.000.
Curtiss-Wright Corporation: *See*—
Mount, Robert E.; and Gavrun, Michael T., 4,090,822, Cl. 418-60.000.
Cuschera, Casper. Self caulking toilet drain. 4,090,267, Cl. 4-288.000.
Cyr, Richard D.: *See*—
Ott, John J.; Ward, Thomas F.; and Cyr, Richard D., 4,091,186, Cl. 429-157.000.
Czeczerski, Nordfried. Spark plug tightener. 4,090,421, Cl. 81-52.40R.
Czernakowski, Waldemar, to Romer-Wingard Autogurte GmbH. Safety harness for earthmoving equipment. 4,090,735, Cl. 297-388.000.
Dahlberg, Harry R.: *See*—
Riggs, William F.; Veloz, Jaime; and Dahlberg, Harry R., 4,091,070, Cl. 423-41.000.
Daido Steel Co., Ltd.: *See*—
Akama, Kazuo, 4,090,558, Cl. 165-155.000.
Daikin Kogyo Co., Ltd.: *See*—
Ohsaka, Yohnosuke; and Morimoto, Osamu, 4,091,043, Cl. 260-653.700.
Dainichi Nihon Densen Kabushiki Kaisha: *See*—
Kakinuma, Mitsuo; Motegi, Isoji; Matsui, Yasuo; Matsui, Masatake; Ohtsuju, Masaaki; Takahashi, Kiyoshi; and Fukuda, Takeo, 4,091,064, Cl. 264-174.000.
Dakin, James T.; Darrow, Kenneth A.; and Alff, Robert K., to General Electric Company. Liquid-cooled turbine bucket with enhanced heat transfer performance. 4,090,810, Cl. 416-97.00R.
Dakin, Wayne Ray, to MCA Technology, Inc. Isolated non-consecutive missing half cycle compensator. 4,091,425, Cl. 360-38.000.
Damsky, Arnold. Plug-in electrical receptacle extender. 4,090,769, Cl. 339-156.00R.
Danbury Drilling Limited: *See*—
Bell, Arthur Oswald; and Reardon Smith, William Antony John, 4,090,368, Cl. 61-93.000.
Daniels, Nicholas R., to Emerson Electric Co. Twist lock self-aligning bearing system. 4,090,749, Cl. 308-132.000.
Daniels, Walter Edgar, Jr.: *See*—
Carrubba, Francis Paul; Daniels, Walter Edgar, Jr.; and Franaszek, Peter Anthony, 4,091,242, Cl. 179-15.55T.
Darden, Donald R. Magnified dial level indicator with magnetic swing plate. 4,090,306, Cl. 33-391.000.
Darrow, Kenneth A.; and Smith, Daniel P., to General Electric Company. Flexible, low porosity airfoil skin. 4,091,146, Cl. 428-594.000.
Darrow, Kenneth A.: *See*—
Dakin, James T.; Darrow, Kenneth A.; and Alff, Robert K., 4,090,810, Cl. 416-97.00R.
Dart Industries Inc.: *See*—
Vandegaer, Jan Edmond, 4,091,200, Cl. 528-495.000.
Datotek, Inc.: *See*—
Branscome, Kenneth M., 4,091,423, Cl. 358-259.000.
Davies, Robert William; Pratt, Frederick; and Pearse, Michael Gordon, to Molins Limited. Wrapping machines. 4,090,912, Cl. 156-502.000.
Davis, Gerald Titus; and Shackle, Dale Richard, to Mead Corporation, The. Process for producing pressure-sensitive copy sheets using novel radiation curable coatings. 4,091,122, Cl. 427-44.000.
Davis, Kirk Emerson, to Lubrizol Corporation, The. Sulfurized Mannich condensation products and fuel compositions containing same. 4,090,854, Cl. 44-73.000.
Davis, Larry D., to Outdoor Sports Inc. Linear objective adjustment device for rifle scope collimation. 4,090,780, Cl. 350-255.000.
Davis, Robert E. Spring assister. 4,090,700, Cl. 267-45.000.
Davison, Sol: *See*—
Gergen, William P.; and Davison, Sol, 4,090,996, Cl. 260-40.00R.
Dawson, Wayne G. Watch spring bar kit. 4,090,606, Cl. 206-223.000.
Day, Paul L.: *See*—
Mucha, George M.; Balzer, Norbert R.; and Day, Paul L., 4,090,698, Cl. 266-133.000.
Dayco Corporation: *See*—
Bollmer, Jacob A., 4,090,302, Cl. 33-168.00B.
Logan, Arthur D., 4,091,063, Cl. 264-94.000.
Stearns, Joseph E., 4,090,444, Cl. 101-415.100.
De Staat Der Nederlanden, Te Dezen Vertegenwoordigd Door De Directeur-Generaal Der Posterijen, Telegrafie En Telefonie: *See*—
Nijenhuis, Emil Johan, 4,091,235, Cl. 178-23.00R.
Dean, Albert G., to Budd Company, The. Weavable railway truck. 4,090,454, Cl. 105-182.00R.
Deans, Harry A.; and Bragg, James R., to Exxon Production Research Company. Method for determining fluid saturations in reservoirs. 4,090,398, Cl. 73-19.000.
DeCesare, Dominic V. Harness horse racing electric system. 4,090,713, Cl. 273-86.00B.
De Graw, Joseph I.: *See*—
Barrett, M. James; and De Graw, Joseph I., 4,091,087, Cl. 424-1.000.
DeHollander, William R.; and Fenimore, Charles P., to General Electric Company. Process for producing uranium oxide rich compositions from uranium hexafluoride. 4,090,976, Cl. 252-301.10R.
de Jonge, Frederik Ate; Dorleijn, Jan Willem Frederik; Druyvesteyn,

Willem Frederik; and Koel, Gerrit Jan, to U.S. Philips Corporation. Device for the magnetic recording by means of a magnetic strip domain as a recording/playback head. 4,091,429, Cl. 360-110.000.
de Kok, Jacob Jan: *See—*
van der Donk, Johannes Martinus Augustinus H.; and de Kok, Jacob Jan, 4,090,293, Cl. 29-628.000.
Del Electronics Corporation: *See—*
Blair, William C., Jr., 4,091,439, Cl. 361-334.000.
Delgadillo, Joseph A. Circuit board and method for producing same. 4,091,125, Cl. 427-96.000.
Della Monica, F. Peter. Graphic recording system. 4,090,301, Cl. 33-76.00R.
Delta-X Corporation: *See—*
McKee, Fount E., 4,090,405, Cl. 73-151.000.
Demarthe, Jean-Michel: *See—*
Lebleu, Albert; Fossi, Paul; and Demarthe, Jean-Michel, 4,090,871, Cl. 75-84.500.
Demonte, Filippo; and Figini, Mario, to Ing. C. Olivetti & C., S.p.A. Desk top electronic computer with a removably mounted ROM. 4,091,446, Cl. 364-200.000.
Dennard, Robert Heath; and Rideout, Vincent Leo, to International Business Machines Corporation. Method of fabrication for field effect transistors (FETs) having a common channel stopper and FET channel doping with the channel stopper doping self-aligned to the dielectric isolation between FETS. 4,090,289, Cl. 29-571.000.
Denzel, Theodor; and Hoehn, Hans, to E. R. Squibb & Sons, Inc. Amino derivatives of 1,2,3,4-tetrahydro-2-oxopyrido[2,3-b]-pyrazine carboxylic acids and esters. 4,091,219, Cl. 544-117.000.
de Rham, Olivier, to Societe d'Assistance Technique Pour Produits Nestle S.A. Process for the production of a vegetable-based sweetened condensed milk. 4,091,118, Cl. 426-46.000.
Derrien, Andre Robert; and Cerati, Celestin, to Aerazur Constructions Aeronautiques. Harness for a man carrying parachute including a mechanism for simultaneous taking the air out of the canopy and unfastening the harness. 4,090,683, Cl. 244-151.00R.
Deschu, Dennis F. Speaker protector. 4,090,582, Cl. 181-150.000.
Desverchere, Jean, to Cefilac. Non-woven webs and method for the dry production thereof. 4,091,161, Cl. 428-288.000.
Detroit Tool and Engineering Company: *See—*
Miner, Earl L.; and Jones, Harold G., 4,090,581, Cl. 180-140.000.
Dettling, Joseph C.: *See—*
Hindin, Saul G.; and Dettling, Joseph C., 4,091,086, Cl. 423-648.00R.
Deubel, Bernard S.; and Schmitt, Donald J., to Therm-O-Disc Incorporated. Bimetal snap disc thermostat arranged to reduce temperature calibration drift. 4,091,354, Cl. 337-343.000.
Deutsch Company Electronic Components Division, The: *See—*
Malsby, Marc W.; and Willey, Norman W., 4,090,764, Cl. 339-103.00M.
Devhorl S.A.: *See—*
Jeannet, Pierre M.; and Girardin, Michel, 4,090,352, Cl. 58-23.00D.
DeVittorio, Joseph M., to Spintex, Inc. Spinning or twisting machine ring drive. 4,090,348, Cl. 57-105.000.
Dexter, Martin: *See—*
Zussman, Hyman W.; Knell, Martin; and Dexter, Martin, 4,091,223, Cl. 548-308.000.
Dexter, Robin William; and Rusling, Douglas, to American Cyanamid Company. Selective flocculation of minerals from a mixture or an ore. 4,090,955, Cl. 209-5.000.
Dey, Arabinda N., to P.R. Mallory & Co. Inc. Ultraminiature high energy density cell. 4,091,188, Cl. 429-174.000.
DeYoung, Russell J.: *See—*
Miley, George H.; Wells, William E.; and DeYoung, Russell J., 4,091,336, Cl. 331-94.50P.
Diamond, Joseph M.; Kuzmik, Joseph T.; Teass, Horace A., Jr.; and McKernan, Patrick F., to McNab, Incorporated. Conductivity cell. 4,091,324, Cl. 324-30.00B.
Diamond Shamrock Corporation: *See—*
Holm, Robert E., 4,090,863, Cl. 71-92.000.
Dichter, Michael: *See—*
Horowitz, Carl; and Dichter, Michael, 4,091,193, Cl. 429-219.000.
Dickinson, Robert, to Babcock & Wilcox Company, The. Heat exchanger. 4,090,554, Cl. 165-1.000.
Dillon, Ronald David; and Fisher, John Frederick, to Union Carbide Corporation. Interrupt control system for a microcomputer. 4,091,447, Cl. 364-200.000.
Dineen, John R.: *See—*
Blaha, James G.; Dineen, John R.; and Wible, John E., 4,091,372, Cl. 340-282.000.
Diolaiti, Erminio: *See—*
Crotti, Giacomo; and Diolaiti, Erminio, 4,090,799, Cl. 403-401.000.
Di Piero, Philip. Cabbage coring tool. 4,090,296, Cl. 30-113.100.
DiPietro, Angelo Richard: *See—*
Donofrio, Frank Carl; and DiPietro, Angelo Richard, 4,091,246, Cl. 200-50.00B.
Dirks, Gary W.; Li, George S.; and Jones, John F., to Standard Oil Company, The. Cross-linked water-swellable indene-maleic anhydride interpolymers. 4,090,998, Cl. 260-63.00R.
Dirks, Gary W.: *See—*
Li, George S.; and Dirks, Gary W., 4,091,199, Cl. 526-280.000.
Distribution Systems, Inc.: *See—*
Mahoney, Christopher I., 4,090,904, Cl. 156-215.000.
Dixie Plating, Inc: *See—*
Eidschun, Charles Douglas, Jr., 4,090,938, Cl. 204-224.00R.
Dixon, Rolland E., to Phillips Petroleum Company. Production of isoprene from isobutane. 4,091,046, Cl. 260-680.00R.
Dixon, William P.; Caldwell, Thomas C.; and Ilfrey, William T., to Exxon Production Research Company. Casing seal and blowout preventer tester and test method. 4,090,395, Cl. 73-40.50R.
Doblhofer, Karl, to Max-Planck-Gesellschaft zur Forderung der Wissenschaftern e.v. Photon detection and counting system. 4,091,277, Cl. 250-214.00R.
Doellner, Oscar Leonard. Radiant energy power source for jet aircraft and missiles. 4,090,359, Cl. 60-39.69R.
Doherty, Norman R.; and Doherty, Richard F. Device for spring-loading a needleless innoculator. 4,090,512, Cl. 128-173.00H.
Doherty, Richard F.: *See—*
Doherty, Norman R.; and Doherty, Richard F., 4,090,512, Cl. 128-173.00H.
Dohogne, James R.; and Sabnis, Ajit V., to Sperry Rand Corporation. Magnetic suspension with magnetic stiffness augmentation. 4,090,745, Cl. 308-10.000.
Doi, Hachiro, to Fuso Keigokin Co., Ltd. Lawn mower construction. 4,090,346, Cl. 56-13.600.
Donley, Virgil L.; and Spector, George. Medicated comb for dandruff and other hair and scalp diseases. 4,090,522, Cl. 132-112.000.
Donofrio, Frank Carl; and DiPietro, Angelo Richard, to Burroughs Corporation. Encryption device interlock. 4,091,246, Cl. 200-50.00B.
Dorleijn, Jan Willem Frederik: *See—*
de Jonge, Frederik Ate; Dorleijn, Jan Willem Frederik; Druyvesteyn, Willem Frederik; and Koel, Gerrit Jan, 4,091,429, Cl. 360-110.000.
Dornier GmbH: *See—*
Zimmer, Herbert, 4,090,681, Cl. 244-45.00R.
Dow Badische Canada Limited: *See—*
Marshall, Larry A.; and Murdock, Alexander Hamilton, 4,090,674, Cl. 241-221.000.
Dow Chemical Company, The: *See—*
Bon, Charles K., 4,090,924, Cl. 204-1.00T.
Gessell, Donald Earl; and Lowery, Kirby, Jr., 4,091,082, Cl. 423-413.000.
Moll, Norman G.; and Quarderer, George J., 4,090,943, Cl. 208-10.000.
Dowd, Edward J., to Air Resources, Inc. Gas flow pervious support and retaining structure for particulate material. 4,090,852, Cl. 23-288.00F.
Draghici, Adrian: *See—*
Teodorescu, Constantin; Chiriac, Ilie; Sava, Cornel Doru; Draghici, Adrian; and Zinca, Sabin, 4,090,814, Cl. 417-178.000.
Dragon, Martin Stephen; and Clark, Peter Parkhill, to American Optical Corporation. Apparatus for testing the refractive power(s) of lenses. 4,090,790, Cl. 356-125.000.
Drapal, Radovan: *See—*
Rybar, Vaclav; Drapal, Radovan; and Kabelik, Radim, 4,090,476, Cl. 122-367.0PF.
Dresner, Joseph; and Hang, Kenneth Warren, to RCA Corporation. Article with electrically-resistive glaze for use in high-electric fields and method of making same. 4,091,144, Cl. 428-328.000.
Dresser Industries, Inc.: *See—*
Martin, Albert Edward, 4,090,615, Cl. 213-151.000.
Drew Chemical Corp.: *See—*
Scanley, Clyde S., 4,090,992, Cl. 260-29.6AT.
Druyvesteyn, Willem Frederik: *See—*
de Jonge, Frederik Ate; Dorleijn, Jan Willem Frederik; Druyvesteyn, Willem Frederik; and Koel, Gerrit Jan, 4,091,429, Cl. 360-110.000.
D'Silva, Themistocles D. J., to Union Carbide Corporation. Thiosulfenylcarbamoyl halides. 4,091,016, Cl. 260-544.00C.
D'Spain, Gary L. Warning flag for vehicles. 4,090,468, Cl. 116-132.00R.
Dubiel, Bernice R.: *See—*
Dubiel, John A.; and Dubiel, Bernice R., 4,090,646, Cl. 222-326.000.
Dubiel, John A.; and Dubiel, Bernice R. Soft food dispenser. 4,090,646, Cl. 222-326.000.
Dubin, Stephen, to Research Corporation. Osmotically balanced anticoaglant. 4,090,977, Cl. 252-408.000.
Dubreuil, Serge, to S.A. Ermeto. Bending-tool and a device fitted out with such a tool. 4,090,387, Cl. 72-217.000.
Dugois, Jean-Pierre: *See—*
Morel, Paul; and Dugois, Jean-Pierre, 4,090,930, Cl. 204-67.000.
Dumont, Claude: *See—*
Nedelec, Lucien; Pierdet, Andre; Dumont, Claude; and Kannengiesser, Marie-Helene, 4,091,115, Cl. 424-330.000.
Dunlop Limited: *See—*
Bennett, William Douglas, 4,090,670, Cl. 241-23.000.
Dunning, Belford O. Applicator container. 4,090,647, Cl. 222-543.000.
Dunning, Beverly W., Jr.; and Chambers, D. Harry, to United States of America, Interior. Process for recovering silver, copper and stainless steel from silver brazed stainless steel sections. 4,090,935, Cl. 204-146.000.
Du Pont de Nemours, E. I., and Company: *See—*
Chen, Mark Chaoming, 4,090,989, Cl. 260-5.000.
Marquisee, Mark James; and Sandell, Lionel Samuel, 4,090,887, Cl. 106-288.00B.
Miller, Philip Eugene, 4,091,137, Cl. 428-198.000.
Shah, Chandrakant Shantilal, 4,091,065, Cl. 264-177.00F.
Dupont, Jean-Pierre; Gregoire, Jean-Francois; Ligier, Michel; and Roy, Jacques, to Souriau & Cie. Apparatus and methods of detecting injection in a diesel engine. 4,090,404, Cl. 73-119.00A.
Duponteil, Daniel R.: *See—*
Lainey, Gilbert P.; and Duponteil, Daniel R., 4,091,240, Cl. 179-15.0BF.

Dura-Plex Industries, Inc.: *See*—
Elmore, Richard R.; and Couch, Benjamin M., 4,091,142, Cl. 428-322.000.

Durden, John A., Jr.; Sousa, Anthony A.; and Stephen, John F., to Union Carbide Corporation. Esters of 3-hydroxyindone compounds. 4,091,006, Cl. 260-410.500.

Durham, Harry G.: *See*—
Carr, John B.; and Durham, Harry G., 4,091,221, Cl. 544-147.000.

Dwyer, Francis G.; and Schwartz, Albert B., to Mobil Oil Corporation. Preparation of zeolites. 4,091,007, Cl. 260-448.00C.

Dybas, Richard A.: *See*—
Grier, Nathaniel; and Dybas, Richard A., 4,091,020, Cl. 260-586.00C.

Dyckerhoff Zementwerke Aktiengesellschaft: *See*—
Rauschenfels, Eberhard, 4,090,882, Cl. 106-99.000.
Rauschenfels, Eberhard, 4,090,883, Cl. 106-99.000.

Dynalytics Corporation: *See*—
Cooper, Herbert W., 4,090,960, Cl. 210-63.00Z.

Dynamit Nobel Aktiengesellschaft: *See*—
Richtzenhain, Hermann; and Riegger, Paul, 4,091,017, Cl. 260-544.00D.

E. R. Squibb & Sons, Inc.: *See*—
Breuer, Hermann; and Treuner, Uwe D., 4,091,212, Cl. 544-27.000.
Chen, Ching-Hong; Tsay, Horng-Mou; and Heyer, Robert E., 4,090,850, Cl. 23-259.000.
Denzel, Theodor; and Hoehn, Hans, 4,091,219, Cl. 544-117.000.
Ondetti, Miguel Angel, 4,091,024, Cl. 260-293.630.
Parker, William L.; Meyers, Edward; Nimeck, Maxwell W.; and Brown, William E., 4,091,092, Cl. 424-118.000.
Slusarchyk, William A.; and Cimarusti, Christopher M., 4,091,216, Cl. 544-30.000.
Varma, Ravi K., 4,091,036, Cl. 260-397.450.

Ebauches S.A.: *See*—
Schneiter, Ali, 4,090,354, Cl. 58-117.000.

Ebeling, Ernest C.: *See*—
Ebeling, Franklin D.; and Ebeling, Ernest C., 4,090,626, Cl. 214-302.000.

Ebeling, Franklin D.; and Ebeling, Ernest C. Trash handling device. 4,090,626, Cl. 214-302.000.

Ebert, Eckehard: *See*—
Bohg, Armin; Ebert, Eckehard; and Mirbach, Erich, 4,091,169, Cl. 428-428.000.

Echida, Nobuhiro: *See*—
Uemura, Masaru; Kuroki, Hitoshi; Echida, Nobuhiro; and Kosaka, Yujiro, 4,091,134, Cl. 428-36.000.

Ecodyne Corporation: *See*—
Bakken, Daniel Allen; Henderson, Robert Allen; and Tischler, Edward Joseph, 4,090,964, Cl. 210-134.000.

Edelbock, Wilhelm K. Collision-responsive alarm with a rotating reflector and warning light. 4,091,369, Cl. 340-262.000.

Edge, Charles K.; and Kunkle, Gerald E., to PPG Industries, Inc. Manufactured glass by contiguous float process. 4,091,156, Cl. 428-192.000.

Edo, Tsukasa: *See*—
Masuyama, Masami; and Edo, Tsukasa, 4,091,393, Cl. 346-139.00C.

Edwards, Ronald Alexander Nixon; Cantrell, Peter Morris; and Miller, John James. Adjusting the proportion of a substance by enzyme treatment. 4,091,116, Cl. 426-42.000.

Efficiency Production, Inc.: *See*—
Nieber, Allen J., 4,090,365, Cl. 61-41.00A.

Egyt Gyogyszervegyeszeti Gyar: *See*—
Benko, Pal; Simonek, Ildiko; Pallos, Laszlo; Kovacs, Jeno; and Magyar, Karoly, 4,091,206, Cl. 542-416.000.

Ehrenfreund, Herbert A.: *See*—
O'Brien, John C.; and Ehrenfreund, Herbert A., 4,091,136, Cl. 428-141.000.

Ehresman, Virgil Alphonse; and McIntyre, George W., to Sperry Rand Corporation. ROM controlled communication system. 4,091,456, Cl. 364-900.000.

Eichelberger, Charles W.; and Garratt, Philip M., to General Electric Company. Noise-immune carrier current actuated control. 4,091,361, Cl. 340-168.00R.

Eichler, Jay Harris; and Gasparaitis, Bernard, to Motorola Inc. Charger/converter console with reel arrangement. 4,091,318, Cl. 320-2.000.

Eidschun, Charles Douglas, Jr., to Dixie Plating, Inc. Apparatus for plating. 4,090,938, Cl. 204-224.00R.

Ejiri, Masakazu: *See*—
Kashioka, Seiji; Ejiri, Masakazu; Mese, Michihiro; Miyatake, Takafumi; Hamada, Toshimitsu; and Yamazaki, Isamu, 4,091,394, Cl. 340-146.30H.

Ekato-Werk Erich Karl Todtenhaupt: *See*—
Kipke, Klausdieter, 4,090,696, Cl. 366-327.000.

Elam, James O. Esophago-pharyngeal airway. 4,090,518, Cl. 128-349.00B.

Elderkin, Patrick John, to Johnson & Starley Limited. Tri-state electrical circuit. 4,090,664, Cl. 236-11.000.

Electric Furnace Company, The: *See*—
Perrine, Ralph J., 4,090,697, Cl. 266-111.000.

Electric Power Research Institute, Inc.: *See*—
Rabinowitz, Mario; and Pachot, James Joseph, 4,091,230, Cl. 174-15.00C.

Electro Sprayer Systems, Inc.: *See*—
Mowbray, Kenneth D.; and Hagen, Kenneth L., 4,090,645, Cl. 222-193.000.

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Gollmick, Hans-Joachim; Klinkhart, Karl; Morzinek, Herbert; Bereiter, Wolfgang; and Rosenstock, Walter, 4,090,307, Cl. 34-9.000.

Eli Lilly and Company: *See*—
Beck, James R.; and Yahner, Joseph A., 4,091,096, Cl. 424-229.000.
Hatfield, Lowell D., 4,091,214, Cl. 544-30.000.
Landis, Paul W., 4,091,323, Cl. 324-.5AH.
Souter, Rex W., 4,091,029, Cl. 260-326.200.
Terrill, Paul Meredith, 4,091,091, Cl. 424-80.000.

Ellis, Gayle F.: *See*—
Shuler, Cobia B.; and Moore, Wesley E., Jr., 4,090,407, Cl. 73-290.00V.

Ellis, John R.; Holma, Gary M.; and Forman, Donald B., to United States of America, Navy. Fiber optic position sensing and indicating apparatus for electrical interference sensitive environments. 4,091,280, Cl. 250-231.00R.

Elmer, Lawrence D.: *See*—
Krein, Vernon R.; and Elmer, Lawrence D., 4,090,624, Cl. 214-77.00R.

Elmore, Richard R.; and Couch, Benjamin M., to Dura-Plex Industries, Inc. Structural panel and method of making same. 4,091,142, Cl. 428-322.000.

Elsner, Georg: *See*—
Vollmer, Hartfrid; Elsner, Georg; Lippsmeier, Bernd; and Hestermann, Klaus, 4,091,012, Cl. 260-465.100.

Elsner, Uwe, to Hauni-Werke Korber & Co. KG. Method and apparatus for comminuting tobacco or the like. 4,090,521, Cl. 131-109.00R.

Eltro GmbH & Co.: *See*—
Zeifang, Gunter, 4,090,774, Cl. 350-6.400.

Emerson Electric Co.: *See*—
Daniels, Nicholas R., 4,090,749, Cl. 308-132.000.
Huffman, John William, 4,091,249, Cl. 200-83.00P.

EMI Limited: *See*—
Hounsfield, Godfrey Newbold, 4,091,287, Cl. 250-362.000.
LeMay, Christopher Archibald Gordon, 4,091,289, Cl. 250-445.00T.
Logan, Allan Beattie; Marsh, Robin Geoffrey; and Fleming, Ian Alexander, 4,091,285, Cl. 250-360.000.
Logan, Allan Beattie; Marsh, Robin Geoffrey; and Fleming, Ian Alexander, 4,091,286, Cl. 250-360.000.

Empire Oil Tool Company: *See*—
Garrison, Marion A., 4,090,574, Cl. 175-106.000.

Endo, Katutoshi; and Ohira, Makoto, to Ricoh Co., Ltd. Support for electrophotographic sensitive plate. 4,091,145, Cl. 428-546.000.

Endo Laboratories, Inc.: *See*—
Teller, Sonia Ruth, 4,091,102, Cl. 424-256.000.

Engelhard Minerals & Chemicals Corporation: *See*—
Hindin, Saul G.; and Dettling, Joseph C., 4,091,086, Cl. 423-648.00R.

Engins Matra: *See*—
Turbier, Paul; and Szekely, Laszlo, 4,091,061, Cl. 264-40.500.

Engle, Thomas H., to General Signal Corporation. Handbrake linkage for transmitting mechanical braking force between adjacent rail vehicles. 4,090,412, Cl. 74-519.000.

Enos, Herman Isaac, Jr., to Hercules Incorporated. Method and apparatus for treating trees. 4,090,328, Cl. 47-12.000.

Enos, Herman Isaac, Jr.: *See*—
Crowson, Paul Richard; and Enos, Herman Isaac, Jr., 4,090,326, Cl. 47-12.000.

Environmental Sciences, Inc.: *See*—
Matson, Wayne R., 4,090,926, Cl. 204-1.00T.

Enzenauer, Sharon Sue; and Schaeffer, Donna Jean. Appartus for supporting and transporting gymnastic equipment. 4,090,689, Cl. 254-7.00R.

Epsilon Lambda Electronics Corp.: *See*—
Knox, Robert M.; and Toulios, Peter P., 4,091,343, Cl. 333-10.000.

Eremeev, Valery Konstantinovich: *See*—
Babasov, Mikhail Vladimirovich; Zazimko, Viktor Afanasievich; Reidemeister, Iraida Ivanovna; Semenenko, Jury Lukich; Pertsikov, Zelik Ilich; Levin, Mikhail Samuilovich; Eremeev, Valery Konstantinovich; and Varava, Leonid Mikhailovich, 4,090,381, Cl. 72-68.000.

Erickson, David G.: *See*—
Look, Lance G.; and Erickson, David G., 4,090,684, Cl. 244-218.000.

Erickson, Frederick L. High displacement-to-size ratio rotary fluid mechanism. 4,090,817, Cl. 417-462.000.

Erickson, Gerald, to International Omni-Pak Corporation. Bottle carrier. 4,090,729, Cl. 294-31.200.

Erisman, Lester R.; and Marsh, Richard A., to United States of America, Air Force. High power, rechargeable, pile type silver zinc battery. 4,091,184, Cl. 429-139.000.

Erismann, Oskar, to BBC Brown Boveri & Company Limited. Single chamber type combustion structure for a gas turbine engine. 4,090,360, Cl. 60-39.290.

Ernst Leitz GmbH: *See*—
Willhelm, Jorg; and Kaul, Dietmar, 4,091,281, Cl. 250-237.00G.

ESB Incorporated: *See*—
Fox, Albert L.; Leeson, Jeffrey S.; and Szabo, Joseph F., 4,091,180, Cl. 429-84.000.
Ott, John J.; Ward, Thomas F.; and Cyr, Richard D., 4,091,186, Cl. 429-157.000.
Szabo, Joseph F., 4,091,179, Cl. 429-84.000.

Escher Wyss Limited: *See*—
Lehmann, Rolf, 4,090,282, Cl. 29-116.0AD.

ESCO Corporation: *See—*
Smith, Floyd O., 4,090,357, Cl. 59-85.000.
Esquire, Inc.: *See—*
McNamara, Albert C., Jr., 4,091,307, Cl. 315-92.000.
Essilor International Compagnie Generale d'Optique: *See—*
Godot, Jean Marie; and Lafargue, Gerard, 4,090,781, Cl. 350-285.000.
Etablissements Larousse: *See—*
Galmiche, Jacques; and Blasco, Robert, 4,090,659, Cl. 206-410.000.
Etchells, Sylvia, to Imperial Chemical Industries Limited. Polyamide fiber. 4,091,022, Cl. 260-2.50N.
Ethyl Corporation: *See—*
Smith, Isaac L.; and Glassbrook, Clarence I., 4,090,392, Cl. 73-421.50R.
Etoh, Motoaki: *See—*
Itoh, Yukinori; Shibata, Mituhiko; Masuda, Akira; Ohtake, Yasuo; and Etoh, Motoaki, 4,090,484, Cl. 123-127.000.
Evgrafov, Konstantin Georgievich: *See—*
Folomin, Anatoly Alexandrovich; Fesenko, Vsevolod Karpovich; Evgrafov, Konstantin Georgievich; Yakovlev, Lev Mikhailovich; and Petrov, Arnold Ivanovich, 4,090,597, Cl. 192-85.0AA.
Exxon Production Research Company: *See—*
Bayhi, Joseph F., 4,091,358, Cl. 340-7.00R.
Deans, Harry A.; and Bragg, James R., 4,090,398, Cl. 73-19.000.
Dixon, William P.; Caldwell, Thomas C.; and Ilfrey, William T., 4,090,395, Cl. 73-40.50R.
Powell, Jerome L., 4,090,561, Cl. 166-292.000.
Exxon Research & Engineering Co.: *See—*
Carter, James L.; and Barnett, Allan E., 4,090,980, Cl. 252-454.000.
Gaines, Lewis H., 4,091,191, Cl. 429-194.000.
Moser, William R., 4,090,982, Cl. 252-465.000.
Potter, Gordon C., 4,090,525, Cl. 137-171.000.
Saidla, Glen E. W., 4,090,833, Cl. 425-451.000.
Serratore, Joseph; and Clayton, William L., 4,091,047, Cl. 260-836.000.
Eyer, Henri: *See—*
Fischer, Nicolas; Boissel, Jacques; Kemp, Thomas; and Eyer, Henri, 4,091,197, Cl. 526-91.000.
F. L. Smidth & Co.: *See—*
Kartman, Helge Carl Christian, 4,090,671, Cl. 241-29.000.
Faber, Kurt Heinrich Albert Erich, to Sandvik Aktiebolag. Cutting insert and rotary milling cutter. 4,090,801, Cl. 407-113.000.
Falk, Robert A., to Ciba-Geigy Corporation. Aqueous wetting and film forming compositions. 4,090,967, Cl. 252-3.000.
Farr, Glyn Phillip Reginald, to Girling Limited. Load sensitive brake control valve assemblies. 4,090,740, Cl. 303-22.00R.
Farrar, Ralph C.: *See—*
Smith, Richard L.; Farrar, Ralph C.; and Willis, Daniel H., 4,091,198, Cl. 526-178.000.
Farrington, Gregory C.; and Roth, Walter L., to General Electric Company. Sealed lithium electrochemical cell with sodium beta-alumina electrolyte. 4,091,182, Cl. 429-101.000.
Farwer, Alfward; Kujawa, Wolfgang; and Schulze, Klaus, to Varta Batterie Aktiengesellschaft. Liquid-tight seal for storage batteries. 4,091,189, Cl. 429-181.000.
Faust, Clifford C.; and Cilia, Philip F., to Union Carbide Corporation. Apparatus for cryogenic freezing of fluid filled pouches. 4,090,374, Cl. 62-341.000.
Fayling, Richard E., to Minnesota Mining and Manufacturing Company. Tamperproof magnetically readable label. 4,090,662, Cl. 235-493.000.
Fegley, Charles R. Fluid dispensing anti-burglar booby trap device. 4,090,644, Cl. 222-180.000.
Fehr, Theodor; and Stadler, Paul, to Sandoz Ltd. 6-Hydrocarbon-ergopeptines. 4,091,099, Cl. 424-250.000.
Felt Products Mfg. Co.: *See—*
Patel, Purshottam S.; and McDowell, Donald J., 4,090,997, Cl. 260-47.0UA.
Femipari Kutato Intezet: *See—*
Boros, Jozsef; Ferenczi, Tibor; Horvath, Gyula; Lazar, Ferenc; Lengyel, Laszlo; Matyasi, Jozsef; Orban nee Kelemen, Maria; Pinter, Tihamer; Sigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Bela; Voros, Istvan; Wentzely, Kalman; Zambo, Janos; and Zoldi, Jozsef, 4,091,071, Cl. 423-121.000.
Fenimore, Charles P.: *See—*
DeHollander, William R.; and Fenimore, Charles P., 4,090,976, Cl. 252-301.10R.
Fenstermaker, Roger W.: *See—*
Becker, Ralph S.; Fenstermaker, Roger W.; and Guillory, Jack P., 4,090,847, Cl. 23-230.00R.
Ferenczi, Tibor: *See—*
Boros, Jozsef; Ferenczi, Tibor; Horvath, Gyula; Lazar, Ferenc; Lengyel, Laszlo; Matyasi, Jozsef; Orban nee Kelemen, Maria; Pinter, Tihamer; Sigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Bela; Voros, Istvan; Wentzely, Kalman; Zambo, Janos; and Zoldi, Jozsef, 4,091,071, Cl. 423-121.000.
Ferrentino, Antonio; and Beretta, Germano, to Industrie Pirelli, S.p.A. Optical fiber cable and manufacture thereof. 4,090,902, Cl. 156-177.000.
Ferri, Johann Walter; and Sutter, Hanspeter, to Luwa AG. Filter box for textile machines, especially a spinning machine. 4,090,857, Cl. 55-337.000.
Fesenko, Vsevolod Karpovich: *See—*
Folomin, Anatoly Alexandrovich; Fesenko, Vsevolod Karpovich; Evgrafov, Konstantin Georgievich; Yakovlev, Lev Mikhailovich; and Petrov, Arnold Ivanovich, 4,090,597, Cl. 192-85.0AA.
Figini, Mario: *See—*
Demonte, Filippo; and Figini, Mario, 4,091,446, Cl. 364-200.000.
FIMEC S.p.A.: *See—*
Pacini, Edo, 4,090,376, Cl. 66-153.000.
Finney, James L., to United States of America, Interior. Detachable cab construction for mining machines. 4,090,736, Cl. 299-30.000.
Fischer, Charles F.; and Joshi, Hargovind H., to Colgate-Palmolive Company. Striated soap bar forming apparatus. 4,090,829, Cl. 425-73.000.
Fischer, Nicolas; Boissel, Jacques; Kemp, Thomas; and Eyer, Henri. Process for polymerization of vinyl chloride micro-suspension with metal compounds. 4,091,197, Cl. 526-91.000.
Fischer, Udo: *See—*
Bauer, Peter; Fischer, Udo; and Hosch, Ludwig, 4,090,773, Cl. 350-1.600.
Fiscus, Thomas Edward, to General Dynamics Corporation Electronics Division. Boresight error compensation in boresighting antenna-radome system. 4,091,388, Cl. 343-872.000.
Fisher, John Frederick: *See—*
Dillon, Ronald David; and Fisher, John Frederick, 4,091,447, Cl. 364-200.000.
Fisher Scientific Company: *See—*
Buck, Francis Fremonte, 4,090,846, Cl. 23-230.00B.
Studer, John Eugene, Jr., 4,090,920, Cl. 195-127.000.
Fisk, Robert W.; and McLaughlin, Michael H., to General Electric Company. Current limiting fuse. 4,091,353, Cl. 337-204.000.
Fisons Limited: *See—*
Harris, John Frederick, 4,091,033, Cl. 260-346.220.
Lovegrove, Brian Walter, 4,090,661, Cl. 233-1.00R.
Fitzwater, John Herman. Fail safe valve actuator. 4,090,589, Cl. 185-40.00R.
Fives-Cail Babcock: *See—*
Beghin, Marcel, 4,090,553, Cl. 164-448.000.
FLAMINIA S.p.A. - Apparecchiature per Ricambio e Depurazione Aria: *See—*
Galassi, Abramo, 4,090,499, Cl. 126-299.00D.
Fleming, Ian Alexander: *See—*
Logan, Allan Beattie; Marsh, Robin Geoffrey; and Fleming, Ian Alexander, 4,091,285, Cl. 250-360.000.
Logan, Allan Beattie; Marsh, Robin Geoffrey; and Fleming, Ian Alexander, 4,091,286, Cl. 250-360.000.
Fletcher-Terry Company, The: *See—*
Insolio, Thomas A., 4,090,420, Cl. 81-5.10A.
Flory, Josef; and Kuhn, Ernst, to Weber AG, Fabrik Elektro-Technischer Artikel und Apparate. Pushbutton-operated circuit breaker. 4,091,351, Cl. 337-62.000.
Flossdorf, Josef; and Schillig, Henning, to Gesellschaft fuer Biotechnologische Forschung mit beschraenkter Haftung (GBF). Double sector cell for an ultra-centrifuge. 4,090,795, Cl. 356-246.000.
FMC Corporation: *See—*
Morganson, Stephen A., 4,090,974, Cl. 252-135.000.
Folomin, Anatoly Alexandrovich; Fesenko, Vsevolod Karpovich; Evgrafov, Konstantin Georgievich; Yakovlev, Lev Mikhailovich; and Petrov, Arnold Ivanovich. Fluid and torque operated friction clutch. 4,090,597, Cl. 192-85.0AA.
Foral, Thomas: *See—*
Maly, George P.; Landess, John A.; and Foral, Thomas, 4,090,562, Cl. 166-304.000.
Ford Aerospace & Communications Corp.: *See—*
Vickland, Jack M., 4,090,413, Cl. 74-665.0GB.
Ford Motor Company: *See—*
Burcz, Lawrence D.; and Whitney, Douglas A., 4,090,417, Cl. 74-864.000.
Heintz, Walter K., 4,091,190, Cl. 429-176.000.
Kaufman, Sydney M., 4,090,874, Cl. 75-246.000.
Labana, Santokh S.; and Theodore, Ares N., 4,091,048, Cl. 260-836.000.
Labana, Santokh S.; and Chang, Yun-Feng, 4,091,049, Cl. 260-836.000.
Minck, Robert W., 4,091,151, Cl. 429-104.000.
Foreman, Jay M., Jr., to Citizen Watch Co., Ltd. Gravity clock. 4,090,351, Cl. 58-23.00D.
Forman, Donald B.: *See—*
Ellis, John R.; Holma, Gary M.; and Forman, Donald B., 4,091,280, Cl. 250-231.00R.
Fortman, Ronald F.: *See—*
Olding, Michael J.; Fortman, Ronald F.; and Stewart, William J., 4,091,438, Cl. 361-189.000.
Fossi, Paul: *See—*
Lebleu, Albert; Fossi, Paul; and Demarthe, Jean-Michel, 4,090,871, Cl. 75-84.500.
Foster, George William, to Chloride Group Limited. Automatic electric battery charging apparatus. 4,091,320, Cl. 320-40.000.
Foster, Walter W.; French, William H.; and Lindberg, Ramon I., to Reynolds Metals Company. System for underground distribution of electrical power and electrical cable construction for use therein. 4,091,291, Cl. 307-95.000.
Fowler, Karl John: *See—*
Bredfeldt, Karin Else; Champ, Robert Bruce; and Fowler, Karl John, 4,090,782, Cl. 350-357.000.
Fox, Albert L.; Leeson, Jeffrey S.; and Szabo, Joseph F., to ESB Incorporated. Vent system with flame arresting capability. 4,091,180, Cl. 429-84.000.

Fox Valley Instrument Company: *See*—
Buhr, George A.; Borowicz, Joseph J.; and McKinnon, Donald C., 4,090,766, Cl. 339-113.00L.

Fragomeni, Dominic: *See*—
Brown, Joseph L., Jr.; Fragomeni, Dominic; and Trageser, James J., 4,091,228, Cl. 13-32.000.

Franaszek, Peter Anthony: *See*—
Carrubba, Francis Paul; Daniels, Walter Edgar, Jr.; and Franaszek, Peter Anthony, 4,091,242, Cl. 179-15.55T.

Francis, John E., to Ciba-Geigy Corporation. Quinolyl or isoquinolyl-lower-alkoxy-phenylene-amino derivatives. 4,091,103, Cl. 424-258.000.

Franz, Helmut; and Vanek, James C., to PPG Industries, Inc. Electroless gold plating bath. 4,091,128, Cl. 427-304.000.

Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H.: *See*—
Theurer, Josef, 4,090,451, Cl. 104-12.000.

Fraser, Douglas S., to FTS Systems, Inc. Freeze dryer particularly adapted for freeze drying materials having highly corrosive vapors. 4,090,312, Cl. 34-92.000.

Freed, Donald L., Jr., to National Mine Service Company. Mining machine conveyor and apparatus for controlling the tension thereon. 4,090,601, Cl. 198-316.000.

Freeman, Richard Reiling: *See*—
Bjorklund, Gary Carl; and Freeman, Richard Reiling, 4,091,290, Cl. 307-88.300.

Freeman, Ronald Harold: *See*—
Angelbeck, Albert Wolcott; Vinje, Edward Wayne; Wisner, George Robert; Freeman, Ronald Harold; Reynolds, Harold C., Jr.; and Witt, Donald Lee, 4,091,274, Cl. 250-201.000.

French, Douglas M.: *See*—
Hellman, Robert R.; and French, Douglas M., 4,091,328, Cl. 325-37.000.

French, William H.: *See*—
Foster, Walter W.; French, William H.; and Lindberg, Ramon I., 4,091,291, Cl. 307-95.000.

Fresnel, Jean-Marie; Kulhanek, Antonin; and Porta, Augusto, to Battelle Memorial Institute. Process for electro-depositing a metal on conducting granules. 4,090,927, Cl. 204-10.000.

Frey, Frederick J.; and Chandler, William F., to InterRoyal Corporation. Recessed pull for movable panels. 4,090,756, Cl. 312-320.000.

Frey, Frederick J.; and Kaminski, Daniel S., to InterRoyal Corporation. Recessed pull for drawers or the like. 4,090,757, Cl. 312-320.000.

Fried. KRUPP Gesellschaft mit beschrankter Haftung: *See*—
von der Ohe, Walter; and Lange, Hans-Jurgen, 4,090,836, Cl. 425-574.000.

Friedman, David, to Computervision Corporation, The. Method and apparatus for damping stepper motors. 4,091,316, Cl. 318-696.000.

Frischtenicht, Joseph Fred, to United States of America, Air Force. Pulsed atomic beam apparatus. 4,091,256, Cl. 219-121.00L.

FTS Systems, Inc.: *See*—
Fraser, Douglas S., 4,090,312, Cl. 34-92.000.

Fuchs, Ernst, to Mecafina SA. Installation for the mechanical-biological purification of waste water. 4,090,965, Cl. 210-151.000.

Fuji Jukogyo Kabushiki Kaisha: *See*—
Itoh, Yukinori; Shibata, Mituhiko; Masuda, Akira; Ohtake, Yasuo; and Etoh, Motoaki, 4,090,484, Cl. 123-127.000.

Fuji Kiko Kabushiki Kaisha: *See*—
Yamanashi, Chusaku, 4,090,678, Cl. 242-107.40A.

Fuji Photo Film Co., Ltd.: *See*—
Kasuga, Akira; Akashi, Goro; and Suzuki, Osamu, 4,091,158, Cl. 428-216.000.

Fujii, Hirokazu. Structure for preventing removal of grip covers from metallic bats. 4,090,709, Cl. 273-72.00A.

Fujisawa Pharmaceutical Co., Ltd.: *See*—
Kamiya, Takashi; Teraji, Tsutomu; Hashimoto, Masashi; Nakaguti, Osamu; and Oku, Teruo, 4,091,210, Cl. 544-18.000.

Fujita, Hisaya; Kaieda, Nobuo; and Sato, Setsuo, to Yokogawa Electric Works, Ltd. Self-balancing recorder. 4,091,389, Cl. 346-32.000.

Fujitsu Limited: *See*—
Ando, Hisashige, 4,091,293, Cl. 307-205.000.

Fukatsu, Shunzo: *See*—
Umezawa, Hamao; Umezawa, Sumio; Fukatsu, Shunzo; Seki, Shigeo; Murase, Masao; and Yasuda, Shuntaro, 4,091,202, Cl. 536-10.000.

Fukuda, Minolu, to Takahashi, Norihiko. Egg container. 4,090,658, Cl. 229-2.5EC.

Fukuda, Takeo: *See*—
Kakinuma, Mitsuo; Motegi, Isoji; Matsui, Yasuo; Matsui, Masatake; Ohtsuju, Masaaki; Takahashi, Kiyoshi; and Fukuda, Takeo, 4,091,064, Cl. 264-174.000.

Fukumoto, Toshitsugu: *See*—
Matsumoto, Shiro; Shishido, Jiro; and Fukumoto, Toshitsugu, 4,090,430, Cl. 92-71.000.

Fukusaki, Hiroshi; Niki, Masao; and Yokota, Yukinaga, to Kao Soap Co., Ltd. Process for preparation of oil-in-water emulsions of vinyl polymers. 4,090,991, Cl. 260-23.0EM.

Fukuura, Yukio: *See*—
Honda, Toshio; Tanaka, Shoji; Iwami, Koichi; Fukuura, Yukio; Tanuma, Itsuo; Suzuki, Yoshikatsu; and Akiyoshi, Hiromi, 4,090,546, Cl. 152-347.000.

Fuller, William Brewster; Potter, Edwin F., Jr.; and Marcus, Melvin Arnold, to United Technologies Corporation. Electro-optical switching system. 4,091,273, Cl. 250-199.000.

Furey, Robert J., to Bunker Ramo Corporation. Electrical connection system. 4,090,760, Cl. 339-61.00R.

Furutu, Akira, to Japan Bano'k Co., Ltd. Apparatus for attaching tag pin. 4,090,653, Cl. 227-67.000.

Furuya, Tutomu; and Inowa, Shigeru, to Konishiroku Photo Industry Co., Ltd. Color corrected latent electrostatic images formed using ion-beam screen, plural exposures. 4,090,876, Cl. 96-1.00R.

Fuso Keigokin Co., Ltd.: *See*—
Doi, Hachiro, 4,090,346, Cl. 56-13.600.

Futami, Takehiro: *See*—
Yano, Takeshi; Kanazawa, Seiichiro; Futami, Takehiro; and Ishiyama, Yasuyuki, 4,091,345, Cl. 333-71.000.

G. Hannan & Sons Nominees Proprietary, Limited: *See*—
Hannan, Garnet Marshall Underwood, 4,090,722, Cl. 280-47.320.

Gaber, Martin. Double pole-double throw switch. 4,091,247, Cl. 200-67.00G.

GAF Corporation: *See*—
Cheng, James K. J., 4,090,879, Cl. 96-49.000.

Gaines, Lewis H., to Exxon Research & Engineering Co. Battery having an electrode comprising mixtures of Al and TiS_2. 4,091,191, Cl. 429-194.000.

Gakken Co., Ltd.: *See*—
Iwaoka, Masao; Igeta, Yosuke; Kiku, Toyochika; Kobayashi, Fumio; and Sugai, Tatsuhiko, 4,091,427, Cl. 360-101.000.

Galassi, Abramo, to FLAMINIA S.p.A. - Apparecchiature per Ricambio e Depurazione Aria. Air ventilating and conditioning apparatus. 4,090,499, Cl. 126-299.00D.

Galmiche, Jacques; and Blasco, Robert, to Etablissements Larousse. Insulated container for the storage and transportation of merchandise. 4,090,659, Cl. 206-410.000.

Gamble, Bruce B., to General Electric Company. Cryogenic current lead construction with self-contained automatic coolant vapor flow control. 4,091,298, Cl. 310-52.000.

Gardner-Denver Company: *See*—
Workman, William, Jr., 4,090,688, Cl. 251-25.000.

Garratt, Philip M.: *See*—
Eichelberger, Charles W.; and Garratt, Philip M., 4,091,361, Cl. 340-168.00R.

Garrison, Marion A., to Empire Oil Tool Company. Gear system for an oil well drive. 4,090,574, Cl. 175-106.000.

Gasparaitis, Bernard: *See*—
Eichler, Jay Harris; and Gasparaitis, Bernard, 4,091,318, Cl. 320-2.000.

Gasser, Manfred, to Zimmer, Johannes. Driven squeegee carriage and magnetic beam backup. 4,090,443, Cl. 101-123.000.

Gavrun, Michael T.: *See*—
Mount, Robert E.; and Gavrun, Michael T., 4,090,822, Cl. 418-60.000.

Gaylord, John F., Jr., to Medical Specialties, Incorporated. Orthopedic knee brace. 4,090,508, Cl. 128-80.00C.

Gebruder Boehringer Gesellschaft mit beschrankter Haftung: *See*—
Berbalk, Hermann, 4,090,422, Cl. 82-1.00C.

Gebruder Buhler AG: *See*—
Tschudy, Roland; and Schiess, Eduard, 4,091,463, Cl. 366-298.000.

Geer, Ernest C.: *See*—
Cook, Harold L., Jr.; and Geer, Ernest C., 4,090,564, Cl. 166-314.000.

Gelin, Claude; and Lavigne, Jean, to CGEE Alsthom S.A. Mechanical support system for printed circuit boards. 4,091,440, Cl. 361-415.000.

General Atomic Company: *See*—
Masetti, William R., 4,090,918, Cl. 176-78.000.

General Dynamics Corporation Electronics Division: *See*—
Fiscus, Thomas Edward, 4,091,388, Cl. 343-872.000.

General Electric Company: *See*—
Anthony, Thomas R.; and Cline, Harvey E., 4,091,257, Cl. 219-121.0EB.
Boliver, Vincent J.; and Belcher, James E., 4,090,765, Cl. 339-111.000.
Clausen, Edward M., 4,091,163, Cl. 428-336.000.
Dakin, James T.; Darrow, Kenneth A.; and Alff, Robert K., 4,090,810, Cl. 416-97.00R.
Darrow, Kenneth A.; and Smith, Daniel P., 4,091,146, Cl. 428-594.000.
DeHollander, William R.; and Fenimore, Charles P., 4,090,976, Cl. 252-301.10R.
Eichelberger, Charles W.; and Garratt, Philip M., 4,091,361, Cl. 340-168.00R.
Farrington, Gregory C.; and Roth, Walter L., 4,091,182, Cl. 429-101.000.
Fisk, Robert W.; and McLaughlin, Michael H., 4,091,353, Cl. 337-204.000.
Gamble, Bruce B., 4,091,298, Cl. 310-52.000.
Healy, William A.; Ward, William J., III; and Vermilyea, David A., 4,090,849, Cl. 23-253.0TP.
Johnson, Chandler A., 4,091,314, Cl. 318-464.000.
Niederjohn, Wayne M.; and Underwood, John R., 4,091,349, Cl. 336-192.000.
Smith, William Edward, 4,091,041, Cl. 568-865.000.
Whitten, James R., 4,091,342, Cl. 332-29.00R.
Wilkinson, Stanley B., 4,091,433, Cl. 361-76.000.

General Packaging Equipment Company: *See*—
Kelly, Robert C., 4,090,344, Cl. 53-28.000.

General Signal Corporation: *See*—
Engle, Thomas H., 4,090,412, Cl. 74-519.000.
Sibley, Henry C., 4,091,292, Cl. 307-130.000.

Generale Ultrasuoni S.p.A.: *See*—
Crotti, Giacomo; and Diolaiti, Erminio, 4,090,799, Cl. 403-401.000.

Genovese, Salvatore. Current recycling electric motor system. 4,091,313, Cl. 318-439.000.
Georg Fischer A.G.: *See—*
Reich, Fritz, 4,090,899, Cl. 156-79.000.
George, Peter K., to Rockwell International Corporation. Multiple chevron passive generator. 4,091,458, Cl. 365-12.000.
George, Robert A.; and Pogorel, John, Jr., to Chrysler Corporation. Forming of high strength aluminum alloy. 4,090,889, Cl. 148-11.50A.
Gerecke, Max; Kyburz, Emilio; and Kaplan, Jean-Pierre, to Hoffmann-La Roche Inc. Dibenz[b,f]oxepin derivatives. 4,091,023, Cl. 544-378.000.
Gergen, William P.; and Davison, Sol, to Shell Oil Company. Multi-component polyester-block copolymer-polymer blends. 4,090,996, Cl. 260-40.00R.
Gesellschaft fuer Biotechnologische Forschung mit beschraenkter Haftung (GBF): *See—*
Flossdorf, Josef; and Schillig, Henning, 4,090,795, Cl. 356-246.000.
Gesellschaft fur Kernverfahrenstechnik m.b.H.: *See—*
Hora, Heinrich Wolfgang; and Karger, Friedbert Hans, 4,090,855, Cl. 55-2.000.
Gessell, Donald Earl; and Lowery, Kirby, Jr., to Dow Chemical Company, The. Hydrocarbon soluble catalyst containing dinitrogen or dihydrogen transition metal complex. 4,091,082, Cl. 423-413.000.
Gibson-Homans Company, The: *See—*
Slywka, Michael, 4,091,457, Cl. 366-304.000.
Gillespie, Gerald J.: *See—*
Gormley, William T.; and Gillespie, Gerald J., 4,090,986, Cl. 260-2.5EP.
Gillette Company, The: *See—*
Baker, Hugh William Barnes, 4,090,642, Cl. 222-94.000.
Pentney, Harry, 4,090,638, Cl. 221-307.000.
Giolma, William Henry; and Andresen, Bernhard Hans, to Texas Instruments Incorporated. Phase locked loop using current controlled ring oscillator. 4,091,335, Cl. 331-1.00A.
Girardin, Michel: *See—*
Jeannet, Pierre M.; and Girardin, Michel, 4,090,352, Cl. 58-23.00D.
Girling Limited: *See—*
Farr, Glyn Phillip Reginald, 4,090,740, Cl. 303-22.00R.
Harries, David Anthony, 4,090,533, Cl. 137-627.500.
Giuliano, Joseph A.: *See—*
Jacaruso, Salvatore; and Giuliano, Joseph A., 4,090,900, Cl. 156-85.000.
Glahn, Robert J.: *See—*
Schuller, Ronald A.; and Glahn, Robert J., 4,090,529, Cl. 137-516.290.
Glassbrook, Clarence I.: *See—*
Smith, Isaac L.; and Glassbrook, Clarence I., 4,090,392, Cl. 73-421.50R.
Glaxo Laboratories Limited: *See—*
Cook, Martin Christopher; Gregory, Gordan Ian; and Bradshaw, Janice, 4,091,209, Cl. 544-16.000.
Glen Walton Company Limited: *See—*
Roberts, Gordon, 4,090,276, Cl. 19-99.000.
Gluck, Gunter: *See—*
Blank, Jochen; and Gluck, Gunter, 4,090,377, Cl. 66-154.00A.
Gocho, Nagahiro: *See—*
Sawamura, Ichiro; Sogi, Shinroku; Kamachi, Shin-ichi; Yoshinaga, Makoto; Goto, Atsuo; Izawa, Masao; Nakajima, Yoshio; Gocho, Nagahiro; Shinohara, Toshio; and Hattori, Shin-ichiro, 4,090,921, Cl. 195-127.000.
Gockel, Jack L., to Cragar Industries, Inc. Method of improving operation of internal combustion engines. 4,090,477, Cl. 123-1.00R.
Godfrey, John N., to Olin Corporation. Coating composition for organic polymeric films. 4,091,170, Cl. 428-510.000.
Godot, Jean Marie; and Lafargue, Gerard, to Essilor International Compagnie Generale d'Optique. Mirror orienting device for a laser levelling instrument. 4,090,781, Cl. 350-285.000.
Goeman, Friedrich, to W. R. Bonsal Company. Inhibitors for alkali-glass reactions in glass fiber reinforced cement products. 4,090,884, Cl. 106-99.000.
GOETZEWERKE Friedrich Goetze AG: *See—*
Morsbach, Martin; Johren, Paul; and Weiss, Jurgen, 4,090,720, Cl. 277-140.000.
Golda, Eugene: *See—*
Chu, Simon Long; Golda, Eugene; and Wilkes, Alan Leonard, 4,090,880, Cl. 96-86.00R.
Goldstein, Stephen L.: *See—*
Babiec, John S., Jr.; Nakos, Steven T.; and Goldstein, Stephen L., 4,090,988, Cl. 260-2.5AC.
Gollmick, Hans-Joachim; Klinkhart, Karl; Morzinek, Herbert; Bereiter, Wolfgang; and Rosenstock, Walter, to Schoeller & Co.; and Elektrotechnische Fabrik GmbH & Co. Method for removing water from workpieces and apparatus therefor. 4,090,307, Cl. 34-9.000.
Golovanov, Nikolai Vasilievich; Ivanov, Vitaly Alexandrovich; Mitor, Vyacheslav Vladimirovich; Parshin, Anatoly Alexeevich; Sapozhnikov, Fedor Vasilievich; Ter-Minosian, Sergei Mikhailovich; and Chavchanidze, Evgeny Kirillovich. Steam generator for steam power plant. 4,090,473, Cl. 122-6.00A.
Goodman, David Samuel, to International Telephone and Telegraph Corporation. Low insertion force electrical connector. 4,090,772, Cl. 339-258.00R.
Goodnight, Kenneth C., Jr.; Hartman, Grant H., Jr.; and Marquardt, Robert F., to Mead Johnson & Company. Liquid dietary product containing soy protein membrane isolate. 4,091,120, Cl. 426-598.000.
Goodyear Tire & Rubber Company, The: *See—*
Christie, Christopher E.; and Steffey, Eddie B., 4,090,909, Cl. 156-414.000.
Parker, Dane K., 4,091,225, Cl. 560-20.000.
Renbarger, Romaine L., 4,090,295, Cl. 29-789.000.
Gorai, Tokio; and Akiba, Kunio, to Chisso Engineering Co Ltd. Method for regenerating iron-EDTA solutions used for scrubbing plug gases. 4,091,074, Cl. 423-235.000.
Gormley, William T.; and Gillespie, Gerald J., to Koppers Company, Inc. Thermoset epoxy foam compositions and a method of preparing the same. 4,090,986, Cl. 260-2.5EP.
Gorrell, James M.; Collins, Terry R.; and Windish, Willis E., to Caterpillar Tractor Co. Variable-speed planetary transmission. 4,090,415, Cl. 74-769.000.
Gorvin, John Henry: *See—*
Batchelor, John Frederick; and Gorvin, John Henry, 4,091,108, Cl. 424-275.000.
Gospodar, Reinhard, to Volkswagenwerk Aktiengesellschaft. Throttle closing mechanism for internal combustion engine. 4,090,481, Cl. 123-103.00E.
Goto, Atsuo: *See—*
Sawamura, Ichiro; Sogi, Shinroku; Kamachi, Shin-ichi; Yoshinaga, Makoto; Goto, Atsuo; Izawa, Masao; Nakajima, Yoshio; Gocho, Nagahiro; Shinohara, Toshio; and Hattori, Shin-ichiro, 4,090,921, Cl. 195-127.000.
Goto, Masanobu: *See—*
Suzuki, Hiroshi; Tsujiuchi, Toshio; and Goto, Masanobu, 4,090,743, Cl. 308-9.000.
Gotta, Harold J. Canteen with a straw. 4,090,650, Cl. 224-5.00W.
Gottstein, William J.: *See—*
Kaplan, Murray A.; Gottstein, William J.; and Granatek, Alphonse P., 4,091,213, Cl. 544-27.000.
Gould Inc.: *See—*
Reighter, David H., 4,091,124, Cl. 427-58.000.
Graham, Donald W.; and Rogers, Edward F., to Merck & Co., Inc. 9-Azariboflavin and pharmaceutical composition containing same. 4,091,094, Cl. 424-180.000.
Graham, Louis Atkins: *See—*
McConnell, Bobby Lee; Thornton, Raymond; and Graham, Louis Atkins, 4,091,004, Cl. 260-153.000.
Grain Processing Corporation: *See—*
Reifert, Charles W., 4,090,604, Cl. 198-861.000.
Granatek, Alphonse P.: *See—*
Kaplan, Murray A.; Gottstein, William J.; and Granatek, Alphonse P., 4,091,213, Cl. 544-27.000.
Grant, John L., to Texas Instruments Incorporated. Self-regulating electric heater. 4,091,267, Cl. 219-544.000.
Grapha-Holding AG: *See—*
Muller, Hans, 4,090,441, Cl. 100-7.000.
Gray, Robert Elder, to Mine Safety Appliances Company. Mouthpiece valve for escape breathing apparatus. 4,090,511, Cl. 128-147.000.
Gray Tool Company: *See—*
McGee, John K., 4,090,565, Cl. 166-315.000.
Greason, William D.: *See—*
Anderson, Andrew G.; Greason, William D.; and Prasan, Anantaraman R., 4,091,382, Cl. 340-373.000.
Greaves, Alan John; Greenaway, Phillip Ernest; and Rollett, John Mortimer, to Post Office, The. Oscillator circuit arrangements including nullator-norator pairs. 4,091,340, Cl. 331-132.000.
Greaves, Alan John; Greenaway, Phillip Ernest; and Rollett, John Mortimer, to Post Office, The. Oscillator circuit arrangements including nullator-norator pairs. 4,091,341, Cl. 331-132.000.
Greco, Alex J.: *See—*
Lee, Douglas C.; Ziemkiewicz, Leonard P.; Ardito, Victor P.; and Greco, Alex J., 4,090,551, Cl. 164-137.000.
Green, Donald C., Jr., to Green, Donald C., Sr., a part interest. Monitoring alarm system. 4,091,384, Cl. 340-416.000.
Green, Donald C., Sr.: *See—*
Green, Donald C., Jr., 4,091,384, Cl. 340-416.000.
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., to Kewanee Industries, Inc. Randomly terminated capped polymers. 4,091,113, Cl. 424-329.000.
Greenaway, Phillip Ernest: *See—*
Greaves, Alan John; Greenaway, Phillip Ernest; and Rollett, John Mortimer, 4,091,340, Cl. 331-132.000.
Greaves, Alan John; Greenaway, Phillip Ernest; and Rollett, John Mortimer, 4,091,341, Cl. 331-132.000.
Greene, Michael L. Fluid current motor. 4,090,811, Cl. 416-119.000.
Gregoire, Jean-Francois: *See—*
Dupont, Jean-Pierre; Gregoire, Jean-Francois; Ligier, Michel; and Roy, Jacques, 4,090,404, Cl. 73-119.00A.
Gregory, Gordan Ian: *See—*
Cook, Martin Christopher; Gregory, Gordan Ian; and Bradshaw, Janice, 4,091,209, Cl. 544-16.000.
Grier, Nathaniel; and Dybas, Richard A., to Merck & Co., Inc. Method for the preparation of di-bicyclo[3.1.1] and [2.2.1]heptyl and di-bicyclo-[3.1.1] and [2.2.1]heptenyl ketones. 4,091,020, Cl. 260-586.00C.
Grieshaber, Hermann: *See—*
Stumpp, Gerhard; and Grieshaber, Hermann, 4,090,486, Cl. 123-139.0AW.
Stumpp, Gerhard; and Grieshaber, Hermann, 4,090,487, Cl. 123-140.0MP.
Grimaldi, Robert L. Button-shaped toy record player. 4,090,718, Cl. 274-1.00A.
Grimsley, Ernest E. Cutting tool for removing governor chest nozzles and refinishing the nozzle seats. 4,090,805, Cl. 408-111.000.

Grivsky, Eugene M., to Burroughs Wellcome Co. Biologically active amides. 4,091,112, Cl. 424-324.000.

Grout, Edward C., to Sta-Rite Industries, Inc. Softening unit for appliance. 4,090,963, Cl. 210-130.000.

Grumman Aerospace Corporation: *See*—
Leftheris, Basil P.; and Varisco, Angelo, 4,091,260, Cl. 219-149.000.

Grundig E.M.V. Elektro-Mechanische Versuchsanstalt Max Grundig: *See*—
Volkert, Willi, 4,090,654, Cl. 228-40.000.

Grunert, Heinz: *See*—
Petzold, Manfred; Grunert, Heinz; Rupilius, Wolfgang; and Rutzen, Horst, 4,090,845, Cl. 8-169.000.

Grussen, Jean. Screw-type bottle cap having improved sealing properties. 4,090,631, Cl. 215-329.000.

Gruye, Dale W.: *See*—
Katzmann, Fred L.; and Gruye, Dale W., 4,090,632, Cl. 220-4.00R.

GTE Sylvania Incorporated: *See*—
Hay, Warren H.; Kimball, Stephen F.; and Martin, Roy C., 4,090,292, Cl. 29-623.000.

Guillory, Jack P.: *See*—
Becker, Ralph S.; Fenstermaker, Roger W.; and Guillory, Jack P., 4,090,847, Cl. 23-230.00R.

Gulbrandsen, Richard E., to Polaroid Corporation. Automatic film cassette changing apparatus for use in automatic photostudio. 4,091,397, Cl. 354-81.000.

Gulf Research & Development Company: *See*—
Beuther, Harold; and Montagna, Angelo A., 4,090,942, Cl. 208-8.000.

Gulf & Western Manufacturing Company: *See*—
Pim, Norman Lester, 4,090,388, Cl. 72-239.000.
Straube, Peter Jon, 4,090,703, Cl. 271-233.000.

Gundle Plastics (Proprietary) Limited: *See*—
Struve, Friedrich, 4,091,254, Cl. 219-79.000.

Gutman, Arnold D., to Stauffer Chemical Company. Herbicidal acetamidothiomethyl ureas. 4,090,864, Cl. 71-98.000.

Haack, Werner. Sliding-weight scale. 4,090,576, Cl. 177-214.000.

Hacker, Walter L., Jr. Foldable tote bag. 4,090,542, Cl. 150-1.700.

Hage, Jacob M., to M.C.P. Industries, Inc. Multiple metallic layered coated metal product. 4,091,173, Cl. 85-41.000.

Hagen, Kenneth L.: *See*—
Mowbray, Kenneth D.; and Hagen, Kenneth L., 4,090,645, Cl. 222-193.000.

Hake, David F.: *See*—
Hake, David Frederick, 4,090,322, Cl. 46-25.000.

Hake, David Frederick, to Hake, David F. Geometric amusement set. 4,090,322, Cl. 46-25.000.

Haley, Ernest K. Drilling head system for I-beams. 4,090,803, Cl. 408-12.000.

Haley, Ernest K. Circular drill with centering device. 4,090,804, Cl. 408-59.000.

Hall, Floyd Vanmeda, to Liggett Group Inc. Apparatus for cutting filter plugs from a moving filter rod stream. 4,090,424, Cl. 83-330.000.

Hall, Stacy W.: *See*—
Caras, Bernard; and Hall, Stacy W., 4,091,304, Cl. 313-174.000.

Hamada, Toshimitsu: *See*—
Kashioka, Seiji; Ejiri, Masakazu; Mese, Michihiro; Miyatake, Takafumi; Hamada, Toshimitsu; and Yamazaki, Isamu, 4,091,394, Cl. 340-146.30H.

Hamalainen, Veikko; and Aarnio, Jaakko. Method of vaporizing liquids. 4,091,056, Cl. 261-19.000.

Hamana Iron Works Co., Ltd.: *See*—
Ueda, Iwao, 4,090,742, Cl. 308-9.000.

Hamasaki, Iwao: *See*—
Maekawa, Koji; and Hamasaki, Iwao, 4,091,376, Cl. 340-336.000.

Hamilton, Thomas R., to Caterpillar Tractor Co. Tractor-scraper transport bracket. 4,090,724, Cl. 280-415.00R.

Hamlin, Thomas J.: *See*—
Smith, Richard E.; Hamlin, Thomas J.; Stange, Klaus K.; and Cassano, James R., 4,090,704, Cl. 271-246.000.

Hammond, Donald J.: *See*—
Lin, Kingso C.; and Hammond, Donald J., 4,090,984, Cl. 252-511.000.

Hancock, George A.; and McCutcheon, Hugh W., to Slope Indicator Co. Pneumatic transducer for underground burial. 4,090,397, Cl. 73-73.000.

Hancock Laboratories, Inc.: *See*—
Hancock, Warren D.; and Sattler, Frederick P., 4,090,878, Cl. 69-29.000.

Hancock, Warren D.; and Sattler, Frederick P., to Hancock Laboratories, Inc. Arrangement for preparing natural tissue for implantation. 4,090,878, Cl. 69-29.000.

Hang, Kenneth Warren: *See*—
Dresner, Joseph; and Hang, Kenneth Warren, 4,091,144, Cl. 428-328.000.

Hanna, John Edward, to Motorola Inc. Low voltage reference. 4,091,321, Cl. 323-19.000.

Hannan, Garnet Marshall Underwood, to G. Hannan & Sons Nominees Proprietary, Limited. Apparatus for removal of container carriers. 4,090,722, Cl. 280-47.320.

Hanson, Charles M., to United States of America, Army. Two-stage split-cycle cooler with pneumatic piston. 4,090,858, Cl. 62-6.000.

Hanson, Charles M., to United States of America, Army. Dual-displacer two-stage split cycle cooler. 4,090,859, Cl. 62-6.000.

Hant, William, to Northrop Corporation. Area electron gun employing focused circular beams. 4,091,306, Cl. 313-409.000.

Hanyuda, Toshiaki: *See*—
Okada, Toshio; Ohtsuki, Hideharu; Inagaki, Hiroshi; Hanyuda, Toshiaki; Tokuno, Masateru; and Igarashi, Seiichi, 4,091,167, Cl. 428-413.000.

Harada, Koji: *See*—
Nishimaki, Ko; Okamoto, Tomiyasu; Nishimoto, Tsunanori; Kataza, Taiji; Harada, Koji; Murata, Seiichiro; Higashimura, Masayoshi; and Ito, Takanori, 4,090,460, Cl. 114-74.00A.

Harada, Shigenori: *See*—
Okuda, Hiroji; and Harada, Shigenori, 4,090,796, Cl. 403-24.000.

Harbey Hubbell, Incorporated: *See*—
Morris, Alton R., 4,091,431, Cl. 361-45.000.

Harkins, Samuel Jordan; and Johnson, Curtis Robert Alvin, to Leeds & Northrup Company. Press fit bearing retaining bearing size when inserted into support. 4,090,746, Cl. 308-26.000.

Harkness, Joseph R., to Briggs & Stratton Corporation. Brake safety system for a power driven rotary mower. 4,090,345, Cl. 56-10.500.

Harman, Robert Keith. Perimeter surveillance system. 4,091,367, Cl. 340-258.00A.

Harmon, Carlyle, to Johnson & Johnson. Continuous filament nonwoven fabric and method of manufacturing the same. 4,091,140, Cl. 428-288.000.

Harries, David Anthony, to Girling Limited. Fluid valve assemblies. 4,090,533, Cl. 137-627.500.

Harris, John Frederick, to Fisons Limited. Method of making 2-alkoxy-2,3-dihydro-benzofuran-5-ols and their alkyl sulfonic acid esters. 4,091,033, Cl. 260-346.220.

Harris, Thomas G., to Armstrong Cork Company. Photocurable elastomeric polyester composition, fibrous articles impregnated therewith and method of making same. 4,091,141, Cl. 428-290.000.

Hart, Cullen P., to Caterpillar Tractor Co. Tandem roadwheel leveling system for construction vehicles. 4,090,723, Cl. 280-6.00H.

Hartfiel, Arlynn H.: *See*—
Jackson, Jack M.; and Hartfiel, Arlynn H., 4,090,968, Cl. 252-8.50A.

Hartman, Grant H., Jr.: *See*—
Goodnight, Kenneth C., Jr.; Hartman, Grant H., Jr.; and Marquardt, Robert F., 4,091,120, Cl. 426-598.000.

Hartmann, Hans Joerg; Vaeth, Guenter; and Kopke, Helmut, to BASF Aktiengesellschaft. Magnetic recording media. 4,091,143, Cl. 428-328.000.

Harvey Hubbell, Incorporated: *See*—
Hoffman, Ernest Gerhard, 4,090,762, Cl. 339-95.00R.

Harvey, Robin J., to Hughes Aircraft Company. Method and apparatus for on-switching in a crossed-field switch device against high voltage. 4,091,310, Cl. 315-344.000.

Hasbro Industries, Inc.: *See*—
Renegar, Charles Gwin, 4,090,828, Cl. 425-71.000.

Hasegawa, Hiroshi: *See*—
Block, Aleck; and Hasegawa, Hiroshi, 4,090,333, Cl. 51-336.000.

Hasenauer, Dieter: *See*—
Ruch, Jean; and Hasenauer, Dieter, 4,091,174, Cl. 429-27.000.

Hashimoto, Masashi: *See*—
Kamiya, Takashi; Teraji, Tsutomu; Hashimoto, Masashi; Nakaguti, Osamu; and Oku, Teruo, 4,091,210, Cl. 544-18.000.

Haskell, Donald M.; and Carter, Cecil O., to Phillips Petroleum Company. Butadiene purification with simultaneous prefractionation and vinylacetylene rejection. 4,090,923, Cl. 203-51.000.

Hatfield, Lowell D., to Eli Lilly and Company. De-esterification process for cephalosporins. 4,091,214, Cl. 544-30.000.

Hattori, Shin-ichiro: *See*—
Sawamura, Ichiro; Sogi, Shinroku; Kamachi, Shin-ichi; Yoshinaga, Makoto; Goto, Atsuo; Izawa, Masao; Nakajima, Yoshio; Gocho, Nagahiro; Shinohara, Toshio; and Hattori, Shin-ichiro, 4,090,921, Cl. 195-127.000.

Hauk, Thomas D.; and Konishi, Masato Howard, to Service Equipment Design Co., Inc. Apparatus for applying tape and adhesive to wallboard joints. 4,090,914, Cl. 156-523.000.

Hauni-Werke Korber & Co. KG: *See*—
Elsner, Uwe, 4,090,521, Cl. 131-109.00R.
Hinzmann, Alfred, 4,090,826, Cl. 131-23.00R.
Schubert, Bernhard; and Bardenhagen, Dietrich, 4,090,602, Cl. 198-377.000.

Hausch, Gail William: *See*—
Bronson, Wright, Jr.; Ashworth, Thomas, Jr.; Kiemer, Ralph Frederick; and Hausch, Gail William, 4,090,835, Cl. 425-505.000.

Hautau, Charles F., to Ameco Corporation. Machine tool with multiple tool turret. 4,090,281, Cl. 29-40.000.

Hawley, Robert Lyle, to Ralston Purina Company. Method for making imitation margarine. 4,091,121, Cl. 426-603.000.

Hay, Warren H.; Kimball, Stephen F.; and Martin, Roy C., to GTE Sylvania Incorporated. Method of making thermal fuse. 4,090,292, Cl. 29-623.000.

Hayama, Kazuhide, to Mitsubishi Petrochemical Co., Ltd. Surface processing copolymer for synthetic papers. 4,091,165, Cl. 428-409.000.

Hayashi, Kiyoshi, to Shin-Shirasuna Electric Corp. Tape tension imparting apparatus. 4,090,679, Cl. 242-186.000.

Hayashi, Shigeki; Noda, Kazukuni; and Kusaka, Shigeru, to Nusco Kabushiki Kaisha. Servomechanism for rotary type flying cutting apparatus. 4,091,315, Cl. 318-603.000.

Hayashida, Masayoshi: *See*—
Inami, Sumio; Koike, Kiyoshi; Hayashida, Masayoshi; and Yamaoka, Shigeyuki, 4,090,734, Cl. 296-146.000.

Hayes, John C., to UOP Inc. Hydrocarbon conversion with a sulfided acidic multimetallic catalytic composite. 4,090,952, Cl. 208-139.000.

Healy, William A.; Ward, William J., III; and Vermilyea, David A., to General Electric Company. Diagnostic device and manufacture thereof. 4,090,849, Cl. 23-253.0TP.

Hecht, Ralph Julius: *See—*
Wright, Robert Joseph; Mullaly, James Roy; and Hecht, Ralph Julius, 4,090,941, Cl. 204-298.000.

Heckman, LeRoy Francis, Jr., to RCA Corporation. Coaxial cavity microwave oscillator with manually adjustable capacitive feedback element. 4,091,337, Cl. 331-101.000.

Hedgewick, Peter, to International Tools (1973) Limited. Spiral lock safety closure. 4,090,629, Cl. 215-214.000.

Hedrick, Geoffrey S. Fluid quantity indicator. 4,090,408, Cl. 73-304.00C.

Heffler, Jochen, to Licentia Patent-Verwaltungs-G.m.b.H. Gas diffusion electrodes for electrochemical cells with acid electrolytes. 4,091,177, Cl. 429-42.000.

Hegemann, Kenneth J., to Rainmatic International, Ltd. Truss assembly structure. 4,090,528, Cl. 137-344.000.

Heiba, El-Ahmadi I.: *See—*
Bridger, Robert F.; Audeh, Costandi A.; and Heiba, El-Ahmadi I., 4,090,953, Cl. 208-177.000.

Heidelberger Druckmaschinen AG: *See—*
Wirz, Arno, 4,090,702, Cl. 271-108.000.

Heilmann & Littmann, Bau-Aktiengesellschaft: *See—*
List, Franz; and Scheul, Franz, 4,090,363, Cl. 61-31.000.

Heintz, Walter K., to Ford Motor Company. Hermetically sealed alkali metal battery container. 4,091,190, Cl. 429-176.000.

Hellman, Robert R.; and French, Douglas M., to Westport International, Inc. Remote control radio system. 4,091,328, Cl. 325-37.000.

Henderson, Neil Kirkpatrick; and Thomson, Eric, to Smith & McLaurin Limited. Adhesives. 4,091,162, Cl. 428-327.000.

Henderson, Robert Allen: *See—*
Bakken, Daniel Allen; Henderson, Robert Allen; and Tischler, Edward Joseph, 4,090,964, Cl. 210-134.000.

Henkel Kommanditgesellschaft auf Aktien: *See—*
Koch, Karlheinz; and Rutzen, Horst, 4,090,969, Cl. 252-8.55D.
Petzold, Manfred; Grunert, Heinz; Rupilius, Wolfgang; and Rutzen, Horst, 4,090,845, Cl. 8-169.000.

Hercules Incorporated: *See—*
Crowson, Paul Richard; and Enos, Herman Isaac, Jr., 4,090,326, Cl. 47-12.000.
Crowson, Paul Richard, 4,090,327, Cl. 47-12.000.
Enos, Herman Isaac, Jr., 4,090,328, Cl. 47-12.000.

Herman, James N.; and Kaczorowski, David M., to Owens-Illinois, Inc. Plastic bottle testing. 4,090,394, Cl. 73-37.000.

Herman, Richard E. Security system for pay-TV channel. 4,091,413, Cl. 358-118.000.

Herrmann, Henry Otto, Jr., to AMP Incorporated. Micro-miniature circular high voltage connector. 4,090,759, Cl. 339-60.00M.

Hestermann, Klaus; Stengel, Jurgen; Heymer, Gero; and May, Christian, to Hoechst Aktiengesellschaft. Production of phosphine. 4,091,078, Cl. 423-299.000.

Hestermann, Klaus: *See—*
Vollmer, Hartfrid; Elsner, Georg; Lippsmeier, Bernd; and Hestermann, Klaus, 4,091,012, Cl. 260-465.100.

Hewlett-Packard Company: *See—*
Musch, Bernard E.; and Martin, Roy E., 4,091,270, Cl. 235-419.000.

Heyer, Robert E.: *See—*
Chen, Ching-Hong; Tsay, Horng-Mou; and Heyer, Robert E., 4,090,850, Cl. 23-259.000.

Heymer, Gero: *See—*
Hestermann, Klaus; Stengel, Jurgen; Heymer, Gero; and May, Christian, 4,091,078, Cl. 423-299.000.

Hicks, Raymond John, to Vickers Limited. Gear boxes. 4,090,416, Cl. 74-785.000.

Hidaka, Tsuneyoshi, to Ampex Corporation. Circuit and method for demodulating a frequency modulated signal. 4,091,330, Cl. 329-107.000.

Hidan, Hiroshi, to Kabushiki Kaisha Hidan Seisakusho. Method of dyeing a pattern like the grain of wood on the surface of an aluminum. 4,091,126, Cl. 427-262.000.

Higashimura, Masayoshi: *See—*
Nishimaki, Ko; Okamoto, Tomiyasu; Nishimoto, Tsunanori; Kataza, Taiji; Harada, Koji; Murata, Seiichiro; Higashimura, Masayoshi; and Ito, Takanori, 4,090,460, Cl. 114-74.00A.

Higuchi, Minoru; and Yamagata, Tetuo, to Hitachi Kiden Kogyo Ltd. Machine for scraping up grit. 4,090,619, Cl. 214-16.00R.

Hildinger, Otto: *See—*
Kotthaus, Erich; and Hildinger, Otto, 4,090,428, Cl. 90-6.000.

Hill, Maynard L., to Johns Hopkins University, The. Method and apparatus for equipotential plane detection. 4,091,326, Cl. 324-72.000.

Hinck, Carole Clark: *See—*
Hinck, Howard Helmut; and Hinck, Carole Clark, 4,090,514, Cl. 128-214.00F.

Hinck, Howard Helmut; and Hinck, Carole Clark. Pressure infusion device. 4,090,514, Cl. 128-214.00F.

Hindin, Saul G.; and Dettling, Joseph C., to Engelhard Minerals & Chemicals Corporation. Process for production of hydrogen. 4,091,086, Cl. 423-648.00R.

Hinzmann, Alfred, to Hauni-Werke Korber & Co. KG. Method and apparatus for perforating the wrappers of rod-shaped smokers products. 4,090,826, Cl. 131-23.00R.

Hirai, Junichiro, to Tokiwa Leather Industrial Co., Ltd. Decorative synthetic resin sheets having three-dimensional pattern for walls, ceilings or furniture and process for manufacturing same. 4,091,154, Cl. 428-158.000.

Hirakoso, Keiichiro: *See—*
Kano, Motomi; Hirakoso, Keiichiro; Nagai, Yasuhiro; and Horiuchi, Toshio, 4,091,258, Cl. 219-125.120.

Hirmann, Georg, to Homberger, Rudolf Felix. Bladder for force transmission apparatus. 4,090,431, Cl. 92-92.000.

Hirschvogel, Alfred; and Wagner, Friedrich, to Sigri Elektrographit GmbH. Method for the production of graphite-hydrogensulfate. 4,091,083, Cl. 423-415.00R.

Hish, Joseph R., to Industrial Steel Construction, Incorporated. Press construction. 4,090,391, Cl. 72-422.000.

Hitachi Kiden Kogyo Ltd.: *See—*
Higuchi, Minoru; and Yamagata, Tetuo, 4,090,619, Cl. 214-16.00R.

Hitachi, Ltd.: *See—*
Arakawa, Hideo; and Kuniya, Keiichi, 4,091,248, Cl. 200-144.00B.
Kashioka, Seiji; Ejiri, Masakazu; Mese, Michihiro; Miyatake, Takafumi; Hamada, Toshimitsu; and Yamazaki, Isamu, 4,091,394, Cl. 340-146.30H.
Kozima, Yasuyuki; Tanno, Kiyohiko; and Ishi, Ichiro, 4,091,391, Cl. 346-76.00R.
Minato, Akira; Shimizu, Tutomu; and Kanekiyo, Yosio, 4,090,813, Cl. 416-184.000.

Hitachi Shipbuilding & Eng. Co., Ltd.: *See—*
Nishimaki, Ko; Okamoto, Tomiyasu; Nishimoto, Tsunanori; Kataza, Taiji; Harada, Koji; Murata, Seiichiro; Higashimura, Masayoshi; and Ito, Takanori, 4,090,460, Cl. 114-74.00A.

Hitomi, Nobuteru: *See—*
Takahashi, Koichi; Hitomi, Nobuteru; Kizu, Taisuke; Honchi, Hirotugu; and Arita, Kazuo, 4,090,375, Cl. 64-21.000.

Hobart Corporation: *See—*
Meckstroth, Robert C.; and Boshinski, Edwin E., 4,091,449, Cl. 364-466.000.

Hobart Engineering Limited: *See—*
Hobart, Jack, 4,090,432, Cl. 93-20.000.

Hobart, Jack, to Hobart Engineering Limited. Guiding an elongate sheet of packaging material. 4,090,432, Cl. 93-20.000.

Hoechst Aktiengesellschaft: *See—*
Hestermann, Klaus; Stengel, Jurgen; Heymer, Gero; and May, Christian, 4,091,078, Cl. 423-299.000.
Schornig, Eberhard; and Naumann, Gerhard, 4,091,404, Cl. 354-321.000.
Soder, Alfons; and Perrey, Klaus, 4,091,095, Cl. 424-211.000.
Vollmer, Hartfrid; Elsner, Georg; Lippsmeier, Bernd; and Hestermann, Klaus, 4,091,012, Cl. 260-465.100.

Hoehn, Hans: *See—*
Denzel, Theodor; and Hoehn, Hans, 4,091,219, Cl. 544-117.000.

Hoehn, Richard F.; Allen, Norman R.; and Wineburner, Ronald E., to Caterpillar Tractor Co. Winch valve drag brake control. 4,090,693, Cl. 254-187.500.

Hoel, Eivin; and Mathiassen, Svein, to A/S Akers Mek. Verksted. Junction housing for use in undersea oil wells. 4,090,560, Cl. 166-.600.

Hoen, Cuyler: *See—*
Busch, Kieran; and Hoen, Cuyler, 4,090,727, Cl. 292-11.000.

Hoffman, Ernest Gerhard, to Harvey Hubbell, Incorporated. Electrical terminal connection and method of making same. 4,090,762, Cl. 339-95.00R.

Hoffmann, Kurt, to Siemens Aktiengesellschaft. Arrangement, in particular an analog-digital/digital-analog converter and method of operation thereof. 4,091,378, Cl. 340-347.0AD.

Hoffmann-La Roche Inc.: *See—*
Gerecke, Max; Kyburz, Emilio; and Kaplan, Jean-Pierre, 4,091,023, Cl. 544-378.000.
Montavon, Marc; and Reiner, Roland, 4,091,211, Cl. 544-21.000.

Hohmann, Peter: *See—*
Watson, Alan; Hohmann, Peter; Schmid, Herbert; and Schneider, Helmut, 4,091,008, Cl. 260-450.000.

Hohne, Karl, to Siemens Aktiengesellschaft. Air electrode for electrochemical cells. 4,091,175, Cl. 429-40.000.

Hoke, Donald Irvin, to Lubrizol Corporation, The. Substituted salicylamides and lubricants containing the same. 4,090,971, Cl. 252-51.50A.

Holm, Robert E., to Diamond Shamrock Corporation. Compositions containing 5-chloro-3-methyl-4-nitro-1H-pyrazole as fruit abscission agents. 4,090,863, Cl. 71-92.000.

Holma, Gary M.: *See—*
Ellis, John R.; Holma, Gary M.; and Forman, Donald B., 4,091,280, Cl. 250-231.00R.

Holman, John A. Artificial boards and shapes. 4,091,153, Cl. 428-114.000.

Homberger, Rudolf Felix: *See—*
Hirmann, Georg, 4,090,431, Cl. 92-92.000.

Honchi, Hirotugu: *See—*
Takahashi, Koichi; Hitomi, Nobuteru; Kizu, Taisuke; Honchi, Hirotugu; and Arita, Kazuo, 4,090,375, Cl. 64-21.000.

Honda Giken Kogyo Kabushiki Kaisha: *See—*
Tsukisaka, Tsuneo; and Maruoka, Sigehiro, 4,090,634, Cl. 220-302.000.

Honda, Toshio; Tanaka, Shoji; Iwami, Koichi; Fukuura, Yukio; Tanuma, Itsuo; Suzuki, Yoshikatsu; and Akiyoshi, Hiromi, to Bridgestone Tire Company Limited. Puncture-sealing pneumatic tire and a method of producing the tire. 4,090,546, Cl. 152-347.000.

Honeywell Inc.: *See—*
Bernal G., Enrique; Chen, Di; Koepke, Barry G.; and Zook, James David, 4,090,776, Cl. 350-96.120.
Bonne, Ulrich; and Tobias, James R., 4,090,663, Cl. 236-10.000.
Joesting, Frederick D., 4,090,467, Cl. 116-129.00T.
Shafer, Donald E., 4,091,392, Cl. 346-110.00R.
Wilwerding, Dennis J., 4,091,275, Cl. 250-201.000.

Honeywell Information Systems Inc.: *See—*
Raynovic, Samuel G., 4,091,312, Cl. 315-383.000.
Ryan, Charles P., 4,091,445, Cl. 364-200.000.
Tchon, Wallace Edward, 4,091,278, Cl. 307-221.00D.
Woods, John M.; Porter, Marion G.; and Monahan, Earnest M., 4,091,455, Cl. 364-200.000.

Hooker Chemicals & Plastics Corp.: *See—*
Buckholtz, Harry E.; and Bose, Arun C., 4,091,031, Cl. 260-327.00P.
Lange, Norbert G., 4,090,530, Cl. 137-563.000.
Scharf, Daniel J.; and Chamberlin, Howard A., 4,090,959, Cl. 210-58.000.

Hoover, John Russel Eugene; and Weisbach, Jerry Arnold, to Smith-Kline Corporation. Protected α-amino-α-ureido(thioureido)phenylacetic acids. 4,091,227, Cl. 560-9.000.

Hope, Henry F.; and Hope, Stephen F. Adjustable metering pump. 4,090,818, Cl. 417-473.000.

Hope, Stephen F.: *See—*
Hope, Henry F.; and Hope, Stephen F., 4,090,818, Cl. 417-473.000.

Hopeman Brothers, Inc.: *See—*
Brown, Asa V., Jr.; and Suttles, James Marshall, 4,090,315, Cl. 40-518.000.

Hora, Heinrich Wolfgang; and Karger, Friedbert Hans, to Gesellschaft fur Kernverfahrenstechnik m.b.H. Method and apparatus for separation of gaseous particles of different masses by centrifugal forces. 4,090,855, Cl. 55-2.000.

Horan, John J. Mini-boat. 4,090,270, Cl. 9-2.00A.

Hori, Yutaka; Takahashi, Hidekazu; Sunakawa, Makoto; Ijichi, Ichiro; and Kamei, Kiyohiro, to Nitto Electric Industrial Co., Ltd. Heat-curable composite adhesive sheet and method for making. 4,091,157, Cl. 428-196.000.

Horii, Hideo; Otsuki, Yutaka; Kaiya, Atsushi; and Araki, Yoshihiko, to Nippon Oil Company Limited. Coating composition. 4,091,052, Cl. 260-879.000.

Horiuchi, Toshio: *See—*
Kano, Motomi; Hirakoso, Keiichiro; Nagai, Yasuhiro; and Horiuchi, Toshio, 4,091,258, Cl. 219-125.120.

Horowitz, Carl; and Dichter, Michael, to Polymer Research Corp. of America. Rechargeable silver-zinc batteries. 4,091,193, Cl. 429-219.000.

Horvath, Gyula: *See—*
Boros, Jozsef; Ferenczi, Tibor; Horvath, Gyula; Lazar, Ferenc; Lengyel, Laszlo; Matyasi, Jozsef; Orban nee Kelemen, Maria; Pinter, Tihamer; Sigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Bela; Voros, Istvan; Wentzely, Kalman; Zambo, Janos; and Zoldi, Jozsef, 4,091,071, Cl. 423-121.000.

Hosch, Ludwig: *See—*
Bauer, Peter; Fischer, Udo; and Hosch, Ludwig, 4,090,773, Cl. 350-1.600.

Hounsfield, Godfrey Newbold, to EMI Limited. Scanning radiology with initial scan for adjusting system so that detector means operates within its preferred range. 4,091,287, Cl. 250-362.000.

Hubbard, Howard H.; and Walsh, Thomas P., to Antennas for Communications, Inc. Removable mold for forming high frequency antennas. 4,090,834, Cl. 425-470.000.

Hubbard, James Henry; Leclere, Ralph Joseph; and Underhill, Thomas Travis, to International Business Machines Corporation. Automatic copier mode controls. 4,090,787, Cl. 355-14.000.

Huffman, John William, to Emerson Electric Co. Pressure sensitive electrical switch having a snap element. 4,091,249, Cl. 200-83.00P.

Hufford, James N.; and Barden, Wayne A., to CTS Corporation. Mechanical coupling. 4,090,797, Cl. 403-157.000.

Hughes Aircraft Company: *See—*
Harvey, Robin J., 4,091,310, Cl. 315-344.000.
Lee, Don H.; Weller, Kenneth P.; and Thrower, William F., 4,091,408, Cl. 357-56.000.
Moulin, Norbert L., 4,090,771, Cl. 339-217.00S.

Hujik, Ladislav, to Bata Shoe Co., Inc. Apparatus for injection of a sole of two moldable materials for an article of footwear. 4,090,831, Cl. 425-119.000.

Hund, Franz: *See—*
Rademachers, Jakob; Hund, Franz; Pflugmacher, Ingo; and Winter, Gerhard, 4,090,888, Cl. 106-304.000.

Hunt, Frederick Charles; and Wilson, John Gerald, to Australian Atomic Energy Commission. Phenolic amino-carboxylic acid complexes for forming radiopharmaceuticals. 4,091,088, Cl. 424-1.000.

Hunt, Harry E., to Alpine Designs, Inc. Insulated covering. 4,090,269, Cl. 5-343.000.

Hunter (70) Limited: *See—*
Hutchins, Roger, 4,091,356, Cl. 340-3.00T.

Huntsinger, Dean P., to Rockwell International Corporation. Digital indication for selectable impedance circuit. 4,091,381, Cl. 340-347.0AD.

Hurst, George H., Jr. Detent for mechanical linkage. 4,090,273, Cl. 16-144.000.

Hutchins, Roger, to Hunter (70) Limited. Heave compensation system. 4,091,356, Cl. 340-3.00T.

Igarashi, Isaburo; Iizuka, Kazuriki; and Otsuka, Hiroshi, to Toto Electric Industry Co.; and Japanese National Railway. Control apparatus for mortar compounding apparatus. 4,091,462, Cl. 366-17.000.

Igarashi, Seiichi: *See—*
Okada, Toshio; Ohtsuki, Hideharu; Inagaki, Hiroshi; Hanyuda, Toshiaki; Tokuno, Masateru; and Igarashi, Seiichi, 4,091,167, Cl. 428-413.000.

Igarashi, Shigemi: *See—*
Iida, Yozo; Kawahara, Yasuhito; and Igarashi, Shigemi, 4,091,398, Cl. 354-145.000.

Igeta, Yosuke: *See—*
Iwaoka, Masao; Igeta, Yosuke; Kiku, Toyochika; Kobayashi, Fumio; and Sugai, Tatsuhiko, 4,091,427, Cl. 360-101.000.

Iida Denki Kogyo K.K.: *See—*
Ohki, Yoshinori; and Kato, Yoshio, 4,090,488, Cl. 123-148.00E.

Iida, Yozo; Kawahara, Yasuhito; and Igarashi, Shigemi, to Nippon Kogaku K.K.; and Sato Koki K.K. Electronic photoflash unit having remote control device transmitter function. 4,091,398, Cl. 354-145.000.

Iijima, Kenzaburo: *See—*
Takamura, Masayuki; Matsuo, Aritsune; and Iijima, Kenzaburo, 4,090,873, Cl. 75-208.00R.

Iijima, Takashi: *See—*
Mutai, Masahiko; Mada, Mitsuo; Nakajima, Kei; Takahashi, Shusei; Nakao, Takashi; Shimada, Kiyohiro; and Iijima, Takashi, 4,091,117, Cl. 426-43.000.

Iio, Toshimitsu, to Yamaha Hatsudoki Kabushiki Kaisha. Vehicle anti-skid brake system including restricted by-pass flow passage. 4,090,739, Cl. 303-10.000.

Iizuka, Kazuriki: *See—*
Igarashi, Isaburo; Iizuka, Kazuriki; and Otsuka, Hiroshi, 4,091,462, Cl. 366-17.000.

Ijichi, Ichiro: *See—*
Hori, Yutaka; Takahashi, Hidekazu; Sunakawa, Makoto; Ijichi, Ichiro; and Kamei, Kiyohiro, 4,091,157, Cl. 428-196.000.

Ikoma, Hidenobu: *See—*
Kikumoto, Ryoji; Tobe, Akihiro; Tonomura, Shinji; and Ikoma, Hidenobu, 4,091,114, Cl. 424-330.000.

Ilfrey, William T.: *See—*
Dixon, William P.; Caldwell, Thomas C.; and Ilfrey, William T., 4,090,395, Cl. 73-40.50R.

Imai, Takayoshi: *See—*
Tajima, Eiichi; Yamamoto, Kaname; and Imai, Takayoshi, 4,091,135, Cl. 428-40.000.

Imbeaux, Jean-Claude A.: *See—*
Lainey, Gilbert P.; and Imbeaux, Jean-Claude A., 4,091,239, Cl. 179-15.0BF.

Imperial Chemical Industries Limited: *See—*
Andrew, Herbert Francis; Ramsay, David William Crichton; and Stead, Cecil Vivian, 4,091,021, Cl. 260-191.000.
Attwood, Terence Edwin; and Buckley, Ronald Peter, 4,090,993, Cl. 260-29.6NR.
Brydon, Donald Lithgow; and Tomka, Jiri George, 4,091,159, Cl. 428-236.000.
Etchells, Sylvia, 4,091,022, Cl. 260-2.50N.
Punja, Nazim, 4,091,110, Cl. 424-304.000.

Inagaki, Hiroshi: *See—*
Okada, Toshio; Ohtsuki, Hideharu; Inagaki, Hiroshi; Hanyuda, Toshiaki; Tokuno, Masateru; and Igarashi, Seiichi, 4,091,167, Cl. 428-413.000.

Inami, Sumio; Koike, Kiyoshi; Hayashida, Masayoshi; and Yamaoka, Shigeyuki, to Nissan Motor Company, Ltd. Reinforcement member for an automobile door. 4,090,734, Cl. 296-146.000.

Industrial Steel Construction, Incorporated: *See—*
Hish, Joseph R., 4,090,391, Cl. 72-422.000.

Industrie Pirelli, S.p.A.: *See—*
Ferrentino, Antonio; and Beretta, Germano, 4,090,902, Cl. 156-177.000.

Industriewerk Schaeffler OHG: *See—*
Langhammer, Hans; and Loos, Hans, 4,090,687, Cl. 249-60.000.

Ing. C. Olivetti & C., S.p.A.: *See—*
Demonte, Filippo; and Figini, Mario, 4,091,446, Cl. 364-200.000.

Ingersoll-Rand Company: *See—*
Barrows, Robert Earl; and Pauley, Reginald William, 4,090,821, Cl. 418-41.000.
Willover, Larry Neil, 4,090,588, Cl. 184-11.00A.

Inowa, Shigeru: *See—*
Furuya, Tutomu; and Inowa, Shigeru, 4,090,876, Cl. 96-1.00R.

Insolio, Thomas A., to Fletcher-Terry Company, The. Glass breaking pliers. 4,090,420, Cl. 81-5.10A.

Inspiration Consolidated Copper Company: *See—*
Riggs, William F.; Veloz, Jaime; and Dahlberg, Harry R., 4,091,070, Cl. 423-41.000.

Institute po Metaloznanie i Technologia na Metalite: *See—*
Balevski, Angel Tonchev; Nikolov, Ivan Dimov; and Nenov, Dragan Iliev, 4,090,837, Cl. 425-588.000.

Institutul National Pentru Creatie Stiintifica si Tehnica: *See—*
Teodorescu, Constantin; Chiriac, Ilie; Sava, Cornel Doru; Draghici, Adrian; and Zinca, Sabin, 4,090,814, Cl. 417-178.000.

Inta-Roto, Inc.: *See—*
Roberts, Arthur W., Jr., 4,090,469, Cl. 118-410.000.

International Business Machines Corporation: *See—*
Bohg, Armin; Ebert, Eckehard; and Mirbach, Erich, 4,091,169, Cl. 428-428.000.
Bredfeldt, Karin Else; Champ, Robert Bruce; and Fowler, Karl John, 4,090,782, Cl. 350-357.000.
Carrubba, Francis Paul; Daniels, Walter Edgar, Jr.; and Franaszek, Peter Anthony, 4,091,242, Cl. 179-15.55T.
Dennard, Robert Heath; and Rideout, Vincent Leo, 4,090,289, Cl. 29-571.000.
Hubbard, James Henry; Leclere, Ralph Joseph; and Underhill, Thomas Travis, 4,090,787, Cl. 355-14.000.

Kaser, Hans-Peter; Thirion, Philippe; and Ungerbock, Gottfried, 4,091,331, Cl. 329-110.000.
Kauffmann, Elwood Ludwig, 4,091,454, Cl. 360-135.000.
Poley, Neil Myron; and Skolnik, Marvin Benjamin, 4,091,305, Cl. 313-220.000.
Smith, Normand Coy; and Wilson, Joseph Townsend, III, 4,091,390, Cl. 346-75.000.

International Flavors & Fragrances Inc.: *See—*
Schreiber, William L.; Siano, James N.; Vock, Manfred Hugo; and Shuster, Edward J., 4,090,985, Cl. 252-522.000.

International Omni-Pak Corporation: *See—*
Erickson, Gerald, 4,090,729, Cl. 294-31.200.

International Shoe Machine Corporation: *See—*
Sommer, Gerald, 4,090,378, Cl. 69-6.500.

International Telephone and Telegraph Corporation: *See—*
Goodman, David Samuel, 4,090,772, Cl. 339-258.00R.
Maggi, Charles Robert, 4,091,452, Cl. 364-768.000.

International Tools (1973) Limited: *See—*
Hedgewick, Peter, 4,090,629, Cl. 215-214.000.

InterRoyal Corporation: *See—*
Frey, Frederick J.; and Chandler, William F., 4,090,756, Cl. 312-320.000.
Frey, Frederick J.; and Kaminski, Daniel S., 4,090,757, Cl. 312-320.000.

Ishi, Ichiro: *See—*
Kozima, Yasuyuki; Tanno, Kiyohiko; and Ishi, Ichiro, 4,091,391, Cl. 346-76.00R.

Ishida, Akira, to Nippon Telegraph and Telephone Public Corporation. Insulated gate field effect transistor. 4,091,405, Cl. 357-23.000.

Ishida, Shigeyoshi. Device for reforming and grinding the blade of a knife to be sharpened. 4,090,418, Cl. 76-84.000.

Ishida, Shuichi: *See—*
Aoki, Yukio; Wakita, Shizuo; Kato, Shoichi; Tejima, Iwao; and Ishida, Shuichi, 4,091,109, Cl. 424-304.000.

Ishiguro, Toshihiro; and Sanno, Yasushi, to Takeda Chemical Industries, Ltd. Morpholinocarbonyl alkyl N-benzylpiperazines. 4,091,220, Cl. 544-121.000.

Ishimaru, Toshiyasu; and Kawabata, Mariko. 7-((5'-N-Methylthioacetamido)-adipoamido)cephalosporin derivatives. 4,091,217, Cl. 544-30.000.

Ishiyama, Yasuyuki: *See—*
Yano, Takeshi; Kanazawa, Seiichiro; Futami, Takehiro; and Ishiyama, Yasuyuki, 4,091,345, Cl. 333-71.000.

Isono, Katsuo: *See—*
Sanada, Seiji; and Isono, Katsuo, 4,091,411, Cl. 358-28.000.

Itek Corporation: *See—*
Aldrich, Ralph E.; Cumming, William J.; and Simmons, William A., Jr., 4,090,975, Cl. 252-299.000.

Ito, Shinichi; Tanaka, Toshiharu; and Wakabayashi, Noriaki, to Matsushita Electric Industrial Co., Ltd. Electrical circuit for controlling a temperature of a heating element. 4,091,266, Cl. 219-504.000.

Ito, Takanori: *See—*
Nishimaki, Ko; Okamoto, Tomiyasu; Nishimoto, Tsunanori; Kataza, Taiji; Harada, Koji; Murata, Seiichiro; Higashimura, Masayoshi; and Ito, Takanori, 4,090,460, Cl. 114-74.00A.

Itoh, Hiroyuki: *See—*
Mitamura, Kazuyoshi; and Itoh, Hiroyuki, 4,090,891, Cl. 148-28.000.

Itoh, Yukinori; Shibata, Mituhiko; Masuda, Akira; Ohtake, Yasuo; and Etoh, Motoaki, to Fuji Jukogyo Kabushiki Kaisha. Fuel supply system for multi-fuel internal combustion engines. 4,090,484, Cl. 123-127.000.

ITT Industries, Inc.: *See—*
Phillips, Michael James; and Archer, John David, 4,090,778, Cl. 350-96.200.

Ivanov, Vitaly Alexandrovich: *See—*
Golovanov, Nikolai Vasilievich; Ivanov, Vitaly Alexandrovich; Mitor, Vyacheslav Vladimirovich; Parshin, Anatoly Alexeevich; Sapozhnikov, Fedor Vasilievich; Ter-Minosian, Sergei Mikhailovich; and Chavchanidze, Evgeny Kirillovich, 4,090,473, Cl. 122-6.00A.

Ives, Kenneth D.; and Vranka, Ronald S., to United States Steel Corporation. Method and mechanism for determining forces on a solidifying casting. 4,090,549, Cl. 164-4.000.

Iwami, Koichi: *See—*
Honda, Toshio; Tanaka, Shoji; Iwami, Koichi; Fukuura, Yukio; Tanuma, Itsuo; Suzuki, Yoshikatsu; and Akiyoshi, Hiromi, 4,090,546, Cl. 152-347.000.

Iwaoka, Masao; Igeta, Yosuke; Kiku, Toyochika; Kobayashi, Fumio; and Sugai, Tatsuhiko, to Gakken Co., Ltd. Electric control system for magnetic sheet recording and reproducing apparatus for audiovisual instruction. 4,091,427, Cl. 360-101.000.

Izawa, Masao: *See—*
Sawamura, Ichiro; Sogi, Shinroku; Kamachi, Shin-ichi; Yoshinaga, Makoto; Goto, Atsuo; Izawa, Masao; Nakajima, Yoshio; Gocho, Nagahiro; Shinohara, Toshio; and Hattori, Shin-ichiro, 4,090,921, Cl. 195-127.000.

Izushi, Takehiro, to Nintendo Co., Ltd. Rope controlled photo target. 4,090,714, Cl. 273-101.100.

J.H. McDaniel Tele-Communications, Inc.: *See—*
Lavallee, Thomas F., 4,091,366, Cl. 340-258.00R.

J & M Instruments Corp.: *See—*
Jungman, Maury, 4,090,925, Cl. 204-1.00T.

Jabsen, Felix Stanley, to Babcock & Wilcox Company, The. Control rod ejection retardation assembly. 4,090,917, Cl. 176-36.00R.

Jacaruso, Salvatore; and Giuliano, Joseph A., to Acar Laminators Corp. Laminate products useful in the production of bra cups and process for making same. 4,090,900, Cl. 156-85.000.

Jackson, Jack M.; and Hartfiel, Arlynn H., to Chemical Additives Company. Water loss reduction agents. 4,090,968, Cl. 252-8.50A.

Jacobs, Lawrence O'Quinn, to Plastic Products, Inc. Cable gathering and orienting assembly. 4,090,692, Cl. 254-141.000.

Jacquemin, Paul Leroy: *See—*
Simmons, James Almy; Wood, George Edson; and Jacquemin, Paul Leroy, 4,090,866, Cl. 71-108.000.

Jagenberg-Werke Aktiengesellschaft: *See—*
Zodrow, Rudolf, 4,090,913, Cl. 156-560.000.

Jannier, Michel; Berlo, Florent; and Bridier, Jean, to Pechiney Ugine Kuhlmann. Rapid chromic acid anodization. 4,090,929, Cl. 204-28.000.

Japan Bano'k Co., Ltd.: *See—*
Furutu, Akira, 4,090,653, Cl. 227-67.000.

Japan Exlan Company Limited: *See—*
Suzuki, Hiroshi; Sawanishi, Shigeru; and Kusunose, Takamaro, 4,091,066, Cl. 264-182.000.

Japan Steel Works, The: *See—*
Matsumoto, Shiro; Shishido, Jiro; and Fukumoto, Toshitsugu, 4,090,430, Cl. 92-71.000.

Japanese National Railway: *See—*
Igarashi, Isaburo; Iizuka, Kazuriki; and Otsuka, Hiroshi, 4,091,462, Cl. 366-17.000.

Jardine, Robert William; and Johnson, Frederick Paul, to Simon Container Machinery Limited. Production of carton blanks. 4,090,433, Cl. 93-58.20R.

Jariwala, Sharad L., to Upjohn Company, The. Process for recovering lincomycin from fermentation beer. 4,091,204, Cl. 536-11.000.

Jarleton, Paul; and Tollet, Marcel, to Societe pour l'Affranchissement et le Timbrage Automatoques S.A. System for processing mail using documents of diverse formats or types. 4,091,268, Cl. 235-424.000.

Jeannet, Pierre M.; and Girardin, Michel, to Devhorl S.A. Reducing gear-train of an electronic watch with analog display. 4,090,352, Cl. 58-23.00D.

Jensen, Arthur E. Agricultural spoke wheel. 4,090,737, Cl. 301-12.00R.

Jensen, Arthur E. Self purging bearing and bracket for drive shaft of a wheel move irrigation line. 4,090,747, Cl. 308-30.000.

Jensen, Kenneth B. Apparatus for recompacting fibrous materials. 4,090,440, Cl. 100-4.000.

Joesting, Frederick D., to Honeywell Inc. Control point adjustment mechanism. 4,090,467, Cl. 116-129.00T.

Johansson, Anders; and Strombeck, Per, to Salen & Wicander Terminalsystem AB. Method of transhipping general cargo between wheeled carriages and ships, and a plant for working this method. 4,090,620, Cl. 214-16.00B.

John Ott Laboratories, Inc.: *See—*
Ott, John Nash, 4,091,441, Cl. 362-1.000.

Johns Hopkins University, The: *See—*
Hill, Maynard L., 4,091,326, Cl. 324-72.000.

Johnsen, Oscar A. Directional blasting tubes and method of use. 4,090,447, Cl. 102-23.000.

Johnson, Chandler A., to General Electric Company. Circuit apparatus for enabling use of an a-c tachometer as the speed signal from a bi-directional d-c machine. 4,091,314, Cl. 318-464.000.

Johnson, Curtis Robert Alvin: *See—*
Harkins, Samuel Jordan; and Johnson, Curtis Robert Alvin, 4,090,746, Cl. 308-26.000.

Johnson, Frank S., to Marvel Metal Products Company. Cabinet assembly. 4,090,755, Cl. 312-257.00R.

Johnson, Fred L., Jr.; and Patterson, John A., to Texaco Development Corporation. Process for making ether sulfonates. 4,091,014, Cl. 260-512.00R.

Johnson, Frederick Paul: *See—*
Jardine, Robert William; and Johnson, Frederick Paul, 4,090,433, Cl. 93-58.20R.

Johnson, Howard B., to Button, Martha Willis. Vine harvester for use on wet and sloping ground. 4,090,568, Cl. 171-27.000.

Johnson & Johnson: *See—*
Harmon, Carlyle, 4,091,140, Cl. 428-288.000.
Sipos, Tibor, 4,091,090, Cl. 424-45.000.

Johnson, LeRoy E.: *See—*
Argoudelis, Alexander D.; and Johnson, LeRoy E., 4,091,201, Cl. 536-17.000.

Johnson & Starley Limited: *See—*
Elderkin, Patrick John, 4,090,664, Cl. 236-11.000.

Johren, Paul: *See—*
Morsbach, Martin; Johren, Paul; and Weiss, Jurgen, 4,090,720, Cl. 277-140.000.

Jonason, Hans: *See—*
Andersson, Verner; and Jonason, Hans, 4,091,262, Cl. 219-345.000.

Jones, Harold G.: *See—*
Miner, Earl L.; and Jones, Harold G., 4,090,581, Cl. 180-140.000.

Jones, James H.: *See—*
Cragoe, Edward J., Jr.; and Jones, James H., 4,091,107, Cl. 424-274.000.

Jones, John F.: *See—*
Dirks, Gary W.; Li, George S.; and Jones, John F., 4,090,998, Cl. 260-63.00R.

Jones, Thaddeus M.; Shah, Hasmukh R.; and Nash, Charles D., to UMC Industries, Inc. Validator for scrip. 4,091,271, Cl. 235-419.000.

Jonke, Albert A.: *See—*
Vogel, Gerhard John; Jonke, Albert A.; and Snyder, Robert B., 4,091,076, Cl. 423-244.000.

Jorgensen, Olaf V.; and Simonsen, Knud. Conveyor tray system for entrails. 4,090,275, Cl. 17-24.000.

Joshi, Hargovind H.: *See—*
Fischer, Charles F.; and Joshi, Hargovind H., 4,090,829, Cl. 425-73.000.

Jovick, Raymond John; and Malott, Roger James, to Rockwell International Corporation. Wheel speed sensor for drive axle. 4,090,592, Cl. 188-181.00R.

Jubinski, Stephen. Gas economizer. 4,090,466, Cl. 116-114.0AE.

Julius Blum Gesellschaft m.b.H.: *See—*
Rock, Erich; and Mages, Bernhard, 4,090,753, Cl. 312-140.000.

Jungman, Maury, to J & M Instruments Corp. pH measuring instrument and method. 4,090,925, Cl. 204-1.00T.

Kabelik, Radim: *See—*
Rybar, Vaclav; Drapal, Radovan; and Kabelik, Radim, 4,090,476, Cl. 122-367.0PF.

Kabushiki Kaisha Daini Seikosha: *See—*
Masuyama, Masami; and Edo, Tsukasa, 4,091,393, Cl. 346-139.00C.
Morohoshi, Fumio, 4,090,355, Cl. 58-130.00E.
Nakamura, Junpei, 4,091,373, Cl. 340-311.000.

Kabushiki Kaisha Hidan Seisakusho: *See—*
Hidan, Hiroshi, 4,091,126, Cl. 427-262.000.

Kabushiki Kaisha Suwa Seikosha: *See—*
Shimoi, Akio, 4,091,377, Cl. 340-336.000.

Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See—*
Shinoda, Akibumi; and Shimizu, Masahiko, 4,090,578, Cl. 180-52.000.

Kabushiki Kaisha Yakult Honsha: *See—*
Mutai, Masahiko; Mada, Mitsuo; Nakajima, Kei; Takahashi, Shusei; Nakao, Takashi; Shimada, Kiyohiro; and Iijima, Takashi, 4,091,117, Cl. 426-43.000.

Kaczorowski, David M.: *See—*
Herman, James N.; and Kaczorowski, David M., 4,090,394, Cl. 73-37.000.

Kaieda, Nobuo: *See—*
Fujita, Hisaya; Kaieda, Nobuo; and Sato, Setsuo, 4,091,389, Cl. 346-32.000.

Kaim, John Walter: *See—*
Altherr, Russell George; and Kaim, John Walter, 4,090,614, Cl. 213-62.00A.

Kaiya, Atsushi: *See—*
Horii, Hideo; Otsuki, Yutaka; Kaiya, Atsushi; and Araki, Yoshihiko, 4,091,052, Cl. 260-879.000.

Kaizerman, Samuel: *See—*
Singh, Ajaib; and Kaizerman, Samuel, 4,090,990, Cl. 260-18.0PF.

Kakinuma, Mitsuo; Motegi, Isoji; Matsui, Yasuo; Matsui, Masatake; Ohtsuju, Masaaki; Takahashi, Kiyoshi; and Fukuda, Takeo, to Dainichi Nihon Densen Kabushiki Kaisha; and Mitsubishi Petrochemical Co., Ltd. Process for producing electric cable insulated with cured polyolefin. 4,091,064, Cl. 264-174.000.

Kamachi, Shin-ichi: *See—*
Sawamura, Ichiro; Sogi, Shinroku; Kamachi, Shin-ichi; Yoshinaga, Makoto; Goto, Atsuo; Izawa, Masao; Nakajima, Yoshio; Gocho, Nagahiro; Shinohara, Toshio; and Hattori, Shin-ichiro, 4,090,921, Cl. 195-127.000.

Kaman, Charles H. Stringed musical instrument body. 4,090,427, Cl. 84-291.000.

Kamei, Kiyohiro: *See—*
Hori, Yutaka; Takahashi, Hidekazu; Sunakawa, Makoto; Ijichi, Ichiro; and Kamei, Kiyohiro, 4,091,157, Cl. 428-196.000.

Kamimura, Toshio, to Teijin Seiki Company Limited. Fail-safe fluid control valve. 4,090,429, Cl. 91-466.000.

Kaminski, Daniel S.: *See—*
Frey, Frederick J.; and Kaminski, Daniel S., 4,090,757, Cl. 312-320.000.

Kamitsu Seisakusho, Ltd.: *See—*
Yano, Matsunosuke; Yajima, Toshio; and Ohta, Terukazu, 4,090,676, Cl. 242-18.0DD.

Kamiya, Takashi; Teraji, Tsutomu; Hashimoto, Masashi; Nakaguti, Osamu; and Oku, Teruo, to Fujisawa Pharmaceutical Co., Ltd. Preparation of 3-alkyl-3-cephem-4-carboxylic acid compounds from dithio isopropenyl azetidine carboxylic compounds. 4,091,210, Cl. 544-18.000.

Kanazawa, Seiichiro: *See—*
Yano, Takeshi; Kanazawa, Seiichiro; Futami, Takehiro; and Ishiyama, Yasuyuki, 4,091,345, Cl. 333-71.000.

Kanazawa, Shogo; Nakashima, Akira; Yamato, Kazunari; Seriu, Naoyuki; Watanabe, Tohru; and Nakazawa, Susumu, to Nippon Steel Corporation. Welded steel products having low sensitivity to weld cracking and a production method thereof. 4,091,147, Cl. 428-683.000.

Kane, Michael B.: *See—*
Borst, Walter L.; Miller, Stephen K.; and Kane, Michael B., 4,090,494, Cl. 126-270.000.

Kanekiyo, Yosio: *See—*
Minato, Akira; Shimizu, Tutomu; and Kanekiyo, Yosio, 4,090,813, Cl. 416-184.000.

Kannengiesser, Marie-Helene: *See—*
Nedelec, Lucien; Pierdet, Andre; Dumont, Claude; and Kannengiesser, Marie-Helene, 4,091,115, Cl. 424-330.000.

Kano, Motomi; Hirakoso, Keiichiro; Nagai, Yasuhiro; and Horiuchi, Toshio, to Kobe Steel, Ltd. Arc welding process. 4,091,258, Cl. 219-125.120.

Kao Soap Co., Ltd.: *See—*
Fukusaki, Hiroshi; Niki, Masao; and Yokota, Yukinaga, 4,090,991, Cl. 260-23.0EM.

Kaplan, Jean-Pierre: *See—*
Gerecke, Max; Kyburz, Emilio; and Kaplan, Jean-Pierre, 4,091,023, Cl. 544-378.000.

Kaplan, Murray A.; Gottstein, William J.; and Granatek, Alphonse P., to Bristol-Myers Company. 7-Cyclizedamino-3-heterothiomethyl cephalosporin derivatives. 4,091,213, Cl. 544-27.000.

Karami, Hamzeh, to Colgate-Palmolive Company. Disposable diaper with waist fluid barrier. 4,090,515, Cl. 128-284.000.

Karas, Joseph Walter, to Motorola Inc. Method of immobilizing a printed circuit board. 4,091,068, Cl. 264-274.000.

Karasudani, Yasuo; and Yazawa, Hiromi, to Tokico Ltd. Disc brake with positively actuated pads. 4,090,590, Cl. 188-72.500.

Karger, Friedbert Hans: *See—*
Hora, Heinrich Wolfgang; and Karger, Friedbert Hans, 4,090,855, Cl. 55-2.000.

Karsh, Irving, to Bell & Howell Company. Web leader, web winding methods and wound web with leader. 4,090,680, Cl. 242-195.000.

Kartman, Helge Carl Christian, to F. L. Smidth & Co. Tube mill and method for grinding cement clinker. 4,090,671, Cl. 241-29.000.

Kasamatsu, Kiyoshi: *See—*
Ohno, Nobuo; Ohno, Isao; Nishioka, Toshio; Takeda, Hisami; and Kasamatsu, Kiyoshi, 4,091,111, Cl. 424-308.000.

Kaser, Hans-Peter; Thirion, Philippe; and Ungerbock, Gottfried, to International Business Machines Corporation. Arrangement for compensating carrier phase errors in a receiver for discrete data values. 4,091,331, Cl. 329-110.000.

Kashioka, Seiji; Ejiri, Masakazu; Mese, Michihiro; Miyatake, Takafumi; Hamada, Toshimitsu; and Yamazaki, Isamu, to Hitachi, Ltd. Pattern position detecting system. 4,091,394, Cl. 340-146.30H.

Kasiewicz, Stanley J. Electrical overspeed control for an engine. 4,090,480, Cl. 123-102.000.

Kasuga, Akira; Akashi, Goro; and Suzuki, Osamu, to Fuji Photo Film Co., Ltd. Magnetic recording members. 4,091,158, Cl. 428-216.000.

Katakura, Masayuki: *See—*
Yamada, Hisashi; and Katakura, Masayuki, 4,091,295, Cl. 307-229.000.

Kataoka, Hiroshi: *See—*
Omori, Yasuo; and Kataoka, Hiroshi, 4,091,420, Cl. 358-184.000.

Kataza, Taiji: *See—*
Nishimaki, Ko; Okamoto, Tomiyasu; Nishimoto, Tsunanori; Kataza, Taiji; Harada, Koji; Murata, Seiichiro; Higashimura, Masayoshi; and Ito, Takanori, 4,090,460, Cl. 114-74.00A.

Kato, Shoichi: *See—*
Aoki, Yukio; Wakita, Shizuo; Kato, Shoichi; Tejima, Iwao; and Ishida, Shuichi, 4,091,109, Cl. 424-304.000.

Kato, Taizo. Tapping spindle having automatic depth control. 4,090,806, Cl. 408-139.000.

Kato, Yoshio: *See—*
Ohki, Yoshinori; and Kato, Yoshio, 4,090,488, Cl. 123-148.00E.

Katzmann, Fred L.; and Gruye, Dale W., to Ballantine Laboratories, Inc. Adjustable instrument case. 4,090,632, Cl. 220-4.00R.

Kauffmann, Elwood Ludwig, to International Business Machines Corporation. Self-centering disk having an eccentric elliptical-shaped center locating hole. 4,091,454, Cl. 360-135.000.

Kauffmann, Walter E. Hot water booster. 4,090,474, Cl. 122-20.00B.

Kaufman, Irving, to United States of America, Air Force. Method and means for equalizing the sensitivity of a multi-element sensor array. 4,091,279, Cl. 250-225.000.

Kaufman, Sydney M., to Ford Motor Company. Method for improving the sinterability of cryogenically-produced iron powder. 4,090,874, Cl. 75-246.000.

Kaul, Dietmar: *See—*
Willhelm, Jorg; and Kaul, Dietmar, 4,091,281, Cl. 250-237.00G.

Kavis, George. Theater cabinet table. 4,090,754, Cl. 312-196.000.

Kawabata, Mariko: *See—*
Ishimaru, Toshiyasu; and Kawabata, Mariko, 4,091,217, Cl. 544-30.000.

Kawahara, Yasuhito: *See—*
Iida, Yozo; Kawahara, Yasuhito; and Igarashi, Shigemi, 4,091,398, Cl. 354-145.000.

Kawamata, Katsuyoshi, to Sony Corporation. Leader for magnetic recording tape having coextensive flexible layers with metal laminated therebetween. 4,091,168, Cl. 428-416.000.

Kawamoto, Tamio; Takahashi, Asao; and Toyota, Hiroshi, to Nissan Motor Company, Ltd. Solenoid device for electromagnetically operated valve. 4,091,348, Cl. 251-129.000.

Kayabakogyokabushikikaisha: *See—*
Teruyama, Hideo, 4,090,820, Cl. 418-1.000.

Kayahara, Kenji: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Takamatsu, Akira; and Kayahara, Kenji, 4,091,097, Cl. 424-230.000.

Kaye, Frank. I.C. engine having improved air or air-fuel induction system. 4,090,479, Cl. 123-30.00C.

Kaye, Gordon E., to P.R. Mallory & Co. Inc. Battery cartridge. 4,091,187, Cl. 429-159.000.

Kazihara, Akira; Ogawa, Shinsaku; Kobayashi, Takekuni; and Seko, Maomi, to Asahi Kasei Kogyo Kabushiki Kaisha. Method for concentrating aqueous caustic alkali solution. 4,090,932, Cl. 204-98.000.

Keane, James, to Technological Enterprises Corp. Monitor and control for refrigeration system. 4,090,371, Cl. 62-129.000.

Kearney & Trecker Corporation: *See—*
Selander, Douglas S., 4,090,287, Cl. 29-568.000.
Zankl, Frank; Kirkham, Edward E.; Stobbe, Richard E.; and Schachte, John J., 4,091,294, Cl. 318-227.000.

Keel, David LeRoy; and Waugh, Richard Allen, to Babcock & Wilcox

Company, The. High temperature refractory adhesive. 4,090,881, Cl. 106-68.000.

Keller, Kenneth Robert, to RCA Corporation. Forming patterned polycrystalline silicon. 4,090,915, Cl. 156-628.000.

Kelly, Calvin E.; and Lang, John F. Method and apparatus for permanent marking of metal. 4,090,599, Cl. 400-134.000.

Kelly, Donald F. Solar energy system. 4,090,497, Cl. 126-271.000.

Kelly, John, Jr.; and Roper, Wilbur F., to Mobil Oil Corporation. System for automatically flushing hydrocyclones used in drilling mud treatment. 4,090,523, Cl. 134-18.000.

Kelly, Robert C., to General Packaging Equipment Company. Method and apparatus for automatically filling bags with particulate materials. 4,090,344, Cl. 53-28.000.

Kemp, Thomas: *See—*
Fischer, Nicolas; Boissel, Jacques; Kemp, Thomas; and Eyer, Henri, 4,091,197, Cl. 526-91.000.

Kepler, James L., to Allis-Chalmers Corporation. Combination adjustable thrust ring and shaft packing ring for hydraulic turbine wicket gates. 4,090,809, Cl. 415-163.000.

Keppel, Robert A.; and McConaghy, John S., Jr., to Monsanto Company. Preparation of unsaturated primary amines. 4,091,019, Cl. 260-585.00R.

Kerr-McGee Corporation: *See—*
Leonard, Robert E., 4,090,957, Cl. 210-54.000.
Leonard, Robert Edward, 4,090,958, Cl. 210-54.000.

Kewanee Industries, Inc.: *See—*
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., 4,091,113, Cl. 424-329.000.

Kharitonov, Ivan Ivanovich; and Bolshikh, Artemy Stepanovich. Method for the calibration or checking of dynamometers and apparatus embodying same. 4,090,393, Cl. 73-1.00B.

Kidoh, Kunizoh; Kudo, Yoshio; and Suzuki, Fujio, to Kureha Kagaku Kogyo Kabushiki Kaisha. Light transmitting polyvinylidene fluoride or vinylidene fluoride copolymer compositions. 4,091,055, Cl. 260-900.000.

Kiemer, Ralph Frederick: *See—*
Bronson, Wright, Jr.; Ashworth, Thomas, Jr.; Kiemer, Ralph Frederick; and Hausch, Gail William, 4,090,835, Cl. 425-505.000.

Kiku, Toyochika: *See—*
Iwaoka, Masao; Igeta, Yosuke; Kiku, Toyochika; Kobayashi, Fumio; and Sugai, Tatsuhiko, 4,091,427, Cl. 360-101.000.

Kikuchi, Shinichi, to Seiko Seiki Kabushiki Kaisha. Loading and unloading device for a workpiece. 4,090,617, Cl. 214-1.0BB.

Kikumoto, Ryoji; Tobe, Akihiro; Tonomura, Shinji; and Ikoma, Hidenobu, to Mitsubishi Chemical Industries Limited. Pharmaceutically active 2-omega-aminoalkoxydiphenylmethanes. 4,091,114, Cl. 424-330.000.

Kim, Kyong-Min: *See—*
Berkman, Samuel; Kim, Kyong-Min; and Temple, Harold Edgar, 4,090,851, Cl. 23-273.0SP.

Kimball, Stephen F.: *See—*
Hay, Warren H.; Kimball, Stephen F.; and Martin, Roy C., 4,090,292, Cl. 29-623.000.

KIP Corporation: *See—*
Akaoka, Teruhisa, 4,090,983, Cl. 252-501.000.

Kipke, Klausdieter, to Ekato-Werk Erich Karl Todtenhaupt. Interfering flow pattern agitator. 4,090,696, Cl. 366-327.000.

Kirkham, Edward E.: *See—*
Zankl, Frank; Kirkham, Edward E.; Stobbe, Richard E.; and Schachte, John J., 4,091,294, Cl. 318-227.000.

Kitchen, Alonzo G., to Phillips Petroleum Company. Coupled resinous diene copolymer with good integral hinge flex life and high hardness. 4,091,053, Cl. 260-880.00B.

Kizu, Taisuke: *See—*
Takahashi, Koichi; Hitomi, Nobuteru; Kizu, Taisuke; Honchi, Hirotugu; and Arita, Kazuo, 4,090,375, Cl. 64-21.000.

Klaerner, Peter: *See—*
Nottes, Guenther; Bronstert, Klaus; and Klaerner, Peter, 4,090,946, Cl. 208-48.0AA.

Klag, Gunther: *See—*
Putter, Rolf; Klag, Gunther; and Blank, Heinz Ulrich, 4,091,013, Cl. 260-508.000.

Klazar, Jaroslav: *See—*
Turpie, Derek William Fraser; and Klazar, Jaroslav, 4,090,277, Cl. 19-115.00R.

Klein, Hans-Peter; and Nagel, Hartmut, to BBC Brown Boveri & Company Limited. Permanent magnetic material which contains rare earth metals, especially neodymium, and cobalt process for its production and its use. 4,090,892, Cl. 148-103.000.

Kline, Donald Edgar: *See—*
Blankenhorn, Paul Richard; Whiting, David Andrew; and Kline, Donald Edgar, 4,091,148, Cl. 427-314.000.

Kline, James H.: *See—*
Runyan, John G.; and Kline, James H., 4,090,616, Cl. 214-1.0HH.

Klinkhart, Karl: *See—*
Gollmick, Hans-Joachim; Klinkhart, Karl; Morzinek, Herbert; Bereiter, Wolfgang; and Rosenstock, Walter, 4,090,307, Cl. 34-9.000.

Klosterman, David P.: *See—*
Bopp, Robert D.; and Klosterman, David P., 4,090,731, Cl. 296-28.00C.

Kneer, Manfred M. Solar heater. 4,090,493, Cl. 126-270.000.

Knell, Martin: *See—*
Zussman, Hyman W.; Knell, Martin; and Dexter, Martin, 4,091,223, Cl. 548-308.000.

Knorr-Bremse GmbH: *See—*
Pollinger, Hans; and Prahl, Franz, 4,090,591, Cl. 188-73.100.

Knox, Robert M.; and Toulios, Peter P., to Epsilon Lambda Electronics Corp. Insular waveguide directional coupler. 4,091,343, Cl. 333-10.000.

Kobayashi, Akiyoshi; and Nakayama, Yukihiro, to Toyoda-Koki Kabushiki-Kaisha. Apparatus for preventing circumferential overspeeding of a grinding wheel. 4,090,331, Cl. 51-134.50R.

Kobayashi, Fumio: *See—*
Iwaoka, Masao; Igeta, Yosuke; Kiku, Toyochika; Kobayashi, Fumio; and Sugai, Tatsuhiko, 4,091,427, Cl. 360-101.000.

Kobayashi, Takekuni: *See—*
Kazihara, Akira; Ogawa, Shinsaku; Kobayashi, Takekuni; and Seko, Maomi, 4,090,932, Cl. 204-98.000.

Kobe Steel, Ltd.: *See—*
Kano, Motomi; Hirakoso, Keiichiro; Nagai, Yasuhiro; and Horiuchi, Toshio, 4,091,258, Cl. 219-125.120.

Koch, Karlheinz; and Rutzen, Horst, to Henkel Kommanditgesellschaft auf Aktien. Method of oil recovery by flooding employing betaine solutions. 4,090,969, Cl. 252-8.55D.

Koch, Vergil W. Joint-forming device. 4,090,800, Cl. 404-48.000.

Kochenour, Paul R. Windshield washer and deicer. 4,090,668, Cl. 239-130.000.

Koel, Gerrit Jan: *See—*
de Jonge, Frederik Ate; Dorleijn, Jan Willem Frederik; Druyvesteyn, Willem Frederik; and Koel, Gerrit Jan, 4,091,429, Cl. 360-110.000.

Koepke, Barry G.: *See—*
Bernal G., Enrique; Chen, Di; Koepke, Barry G.; and Zook, James David, 4,090,776, Cl. 350-96.120.

Koerner, Gotz; and Rossmy, Gerd, to Th. Goldschmidt AG. Process of preparing polyetherurethane foams. 4,090,987, Cl. 260-2.5AH.

Koff, William. Centrifuge for drying salad greens and the like. 4,090,310, Cl. 34-58.000.

Koff, William. Expansible container. 4,090,593, Cl. 190-44.000.

Koide, Ten: *See—*
Kojima, Shinichi; Nakamura, Kazuro; Koide, Ten; and Ogino, Shigeo, 4,091,093, Cl. 424-177.000.

Koike, Kiyoshi: *See—*
Inami, Sumio; Koike, Kiyoshi; Hayashida, Masayoshi; and Yamaoka, Shigeyuki, 4,090,734, Cl. 296-146.000.

Koinuma, Tokuju, to Tokyo Shibaura Electric Co., Ltd. Microwave heating apparatus. 4,091,252, Cl. 219-10.55R.

Kojima, Shinichi; Nakamura, Kazuro; Koide, Ten; and Ogino, Shigeo, to Sumitomo Chemical Company Limited. Protease inhibitors. 4,091,093, Cl. 424-177.000.

Komiyama, Yoshiro; Kondo, Katsumi; Asano, Yoichiro; and Ando, Mituo, to Toyota Jidosha Kogyo Kabushiki Kaisha. Distributor electrode assembly having outer resistive layer for suppressing noise. 4,091,245, Cl. 200-19.00R.

Komyak, Nikolai Ivanovich: *See—*
Anisovich, Kliment Vladislavovich; and Komyak, Nikolai Ivanovich, 4,091,282, Cl. 250-280.000.

Kondo, Katsumi: *See—*
Komiyama, Yoshiro; Kondo, Katsumi; Asano, Yoichiro; and Ando, Mituo, 4,091,245, Cl. 200-19.00R.

Konishi, Masato Howard: *See—*
Hauk, Thomas D.; and Konishi, Masato Howard, 4,090,914, Cl. 156-523.000.

Konishiroku Photo Industry Co., Ltd.: *See—*
Furuya, Tutomu; and Inowa, Shigeru, 4,090,876, Cl. 96-1.00R.

Kopke, Helmut: *See—*
Hartmann, Hans Joerg; Vaeth, Guenter; and Kopke, Helmut, 4,091,143, Cl. 428-328.000.

Koppers Company, Inc.: *See—*
Gormley, William T.; and Gillespie, Gerald J., 4,090,986, Cl. 260-2.5EP.

Kordesch, Karl Victor, to Union Carbide Corporation. Rechargeable alkaline MnO_2-zinc cell. 4,091,178, Cl. 429-60.000.

Kores Holding Zug AG.: *See—*
Vitek, Robert, 4,091,195, Cl. 526-52.000.

Kosaka, Yujiro: *See—*
Uemura, Masaru; Kuroki, Hitoshi; Echida, Nobuhiro; and Kosaka, Yujiro, 4,091,134, Cl. 428-36.000.

Koss, Muriel L., to Rohr Industries, Inc. Acoustical laminate. 4,091,160, Cl. 428-245.000.

Kosugi, Jyuniti; Kudo, Yoshihiko; and Tagaya, Kiyoshi, to Kureha Kagaku Kogyo Kabushiki Kaisha. Method for the production of alpha type calcium sulfate hemihydrate. 4,091,080, Cl. 423-555.000.

Kotcharian, Michel, to Technigaz. System for loading and unloading at sea a transportation ship conveying incoherent products. 4,090,538, Cl. 141-100.000.

Kotthaus, Erich; and Hildinger, Otto, to Werkzeugmaschinenfabrik Oerlikon-Buhrle. Apparatus for driving the generating or rolling cradle of a gear-cutting machine. 4,090,428, Cl. 90-6.000.

Kovacs, Jeno: *See—*
Benko, Pal; Simonek, Ildiko; Pallos, Laszlo; Kovacs, Jeno; and Magyar, Karoly, 4,091,206, Cl. 542-416.000.

Koyama, Mitsuo: *See—*
Watanabe, Masanori; Onda, Eiichi; Koyama, Mitsuo; Nemoto, Ichiro; and Nakagawa, Tadashi, 4,091,401, Cl. 354-266.000.

Koyo Seiko Company, Limited: *See—*
Okuda, Hiroji; and Harada, Shigenori, 4,090,796, Cl. 403-24.000.

Kozempel, Michael F.: *See—*
Craig, James C., Jr.; and Kozempel, Michael F., 4,091,005, Cl. 260-410.90N.

Kozima, Yasuyuki; Tanno, Kiyohiko; and Ishi, Ichiro, to Hitachi, Ltd. Drive system for thermal recording apparatus. 4,091,391, Cl. 346-76.00R.
Kozuki, Susumu; Sunouchi, Akio; and Watanabe, Yoshiaki, to Canon Kabushiki Kaisha. Electrical power supply transfer system for a camera. 4,091,395, Cl. 354-173.000.
Kraft, Derald H., to Aspro, Inc. Method of making a sintered pulley hub construction. 4,090,284, Cl. 29-159.300.
Kramer, Harold L.; and Lewis, Frederick M., to Marion Health & Safety, Inc. Process for producing an aural communications receiving device. 4,091,067, Cl. 264-222.000.
Kramlehner, Karl, to Asitrade AG. Equipment for the heating of hollow cylindrical rollers of a corrugated paper machine. 4,090,841, Cl. 432-60.000.
Krein, Vernon R.; and Elmer, Lawrence D. Round bale transporter. 4,090,624, Cl. 214-77.00R.
Krisko, Michael L.; and Pare, Donald R., to Connor Engineering & Manufacturing, Inc. Variable induction apparatus with a primary fluid flow controlled induction damper. 4,090,434, Cl. 98-38.00E.
Krude, Werner, to Uni-Cardan AG. Wheel bearing assembly for a wheel hub of a motor vehicle. 4,090,751, Cl. 308-191.000.
Krupp, Carroll Peter, to B. F. Goodrich Company, The. Anti-pollution service station assembly. 4,090,539, Cl. 141-198.000.
Kubacki, Ronald Michael, to United States of America, National Aeronautics and Space Administration. Boron trifluoride coatings for thermoplastic materials and method of applying same in glow discharge. 4,091,166, Cl. 428-411.000.
Kudo, Yoshihiko: *See*—
Kosugi, Jyuniti; Kudo, Yoshihiko; and Tagaya, Kiyoshi, 4,091,080, Cl. 423-555.000.
Kudo, Yoshio: *See*—
Kidoh, Kunizoh; Kudo, Yoshio; and Suzuki, Fujio, 4,091,055, Cl. 260-900.000.
Kuhn, Ernst: *See*—
Flory, Josef; and Kuhn, Ernst, 4,091,351, Cl. 337-62.000.
Kuhn, Hans Heinrich, to Milliken Research Corporation. Liquid, water-insoluble polymeric triphenylmethane colorants and aqueous dispersions containing same. 4,091,034, Cl. 260-391.000.
Kuijpers, Franciscus Antonius; van den Enden, Adrianus Wilhelmus Maria; and Roovers, Antonius Henricus Albertus Maria, to U.S. Philips Corporation. Store comprising drivable domains. 4,091,459, Cl. 365-13.000.
Kujawa, Wolfgang: *See*—
Farwer, Alfward; Kujawa, Wolfgang; and Schulze, Klaus, 4,091,189, Cl. 429-181.000.
Kulhanek, Antonin: *See*—
Fresnel, Jean-Marie; Kulhanek, Antonin; and Porta, Augusto, 4,090,927, Cl. 204-10.000.
Kunishige, Hidenori: *See*—
Yamamoto, Terumasa; Miyagawa, Katsuhiko; Kunishige, Hidenori; and Nakao, Fusafumi, 4,091,284, Cl. 250-337.000.
Kuniya, Keiichi: *See*—
Arakawa, Hideo; and Kuniya, Keiichi, 4,091,248, Cl. 200-144.00B.
Kunkle, Gerald E.: *See*—
Edge, Charles K.; and Kunkle, Gerald E., 4,091,156, Cl. 428-192.000.
Kunz, Peter; and Strobel, Felix, to Mettler Instrumente AG. Weighing apparatus of the electromagnetic load compensation type including protective shield means. 4,090,575, Cl. 177-210.0EM.
Kurath, Paul: *See*—
Tadanier, John Soloman; Martin, Jerry Roy; and Kurath, Paul, 4,091,032, Cl. 260-345.80R.
Kureha Kagaku Kogyo Kabushiki Kaisha: *See*—
Kidoh, Kunizoh; Kudo, Yoshio; and Suzuki, Fujio, 4,091,055, Cl. 260-900.000.
Kosugi, Jyuniti; Kudo, Yoshihiko; and Tagaya, Kiyoshi, 4,091,080, Cl. 423-555.000.
Kuroki, Hitoshi: *See*—
Uemura, Masaru; Kuroki, Hitoshi; Echida, Nobuhiro; and Kosaka, Yujiro, 4,091,134, Cl. 428-36.000.
Kurowski, Benedict; and Sack, George, to Paasche Airbrush Co. Air eraser. 4,090,334, Cl. 51-427.000.
Kurz, German: *See*—
von Linde, Robert; von Linde, Joachim; and Kurz, German, 4,090,839, Cl. 431-89.000.
Kusaka, Shigeru: *See*—
Hayashi, Shigeki; Noda, Kazukuni; and Kusaka, Shigeru, 4,091,315, Cl. 318-603.000.
Kusunose, Takamaro: *See*—
Suzuki, Hiroshi; Sawanishi, Shigeru; and Kusunose, Takamaro, 4,091,066, Cl. 264-182.000.
Kuzev, Lyubomir Vladimirov: *See*—
Stoev, Stoycho Mitrev; Vuchev, Yordan Vladimirov; Kuzev, Lyubomir Vladimirov; and Atzinov, Georgi Petrov, 4,090,937, Cl. 204-180.00R.
Kuzmik, Joseph T.: *See*—
Diamond, Joseph M.; Kuzmik, Joseph T.; Teass, Horace A., Jr.; and McKernan, Patrick F., 4,091,324, Cl. 324-30.00B.
Kwan, Philip H., to S. E. Rykoff & Co. Self-cleaning fluid injection system. 4,090,475, Cl. 222-70.000.
Kyburz, Emilio: *See*—
Gerecke, Max; Kyburz, Emilio; and Kaplan, Jean-Pierre, 4,091,023, Cl. 544-378.000.
La Gard, Inc.: *See*—
Uyeda, Tim M., 4,090,303, Cl. 33-174.00F.
Labana, Santokh S.; and Theodore, Ares N., to Ford Motor Company. Powder coating compositions containing glycidyl ester copolymers and organic carboxylic acid anhydride crosslinking agent. 4,091,048, Cl. 260-836.000.
Labana, Santokh S.; and Chang, Yun-Feng, to Ford Motor Company. Powder coating compositions containing glycidyl ester copolymers and carboxyl terminated crosslinking agent. 4,091,049, Cl. 260-836.000.
Laboratoires de Physicochimie Appliquee, ISSEC S.A.: *See*—
Robillard, Jean Jules, 4,091,375, Cl. 340-324.00R.
LaCreta, Antonio: *See*—
LaCreta, Mario V., 4,090,485, Cl. 123-133.000.
LaCreta, Mario V., to LaCreta, Antonio, a part interest. Fuel systems for internal combustion engines. 4,090,485, Cl. 123-133.000.
Lafargue, Gerard: *See*—
Godot, Jean Marie; and Lafargue, Gerard, 4,090,781, Cl. 350-285.000.
Lainey, Gilbert P.; and Imbeaux, Jean-Claude A. Bit error rate performance monitor units in digital transmission links. 4,091,239, Cl. 179-15.0BF.
Lainey, Gilbert P.; and Duponteil, Daniel R. Bit error rate performance monitor units in digital transmission links. 4,091,240, Cl. 179-15.0BF.
L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude: *See*—
Le Diouron, Raymond J. F., 4,090,369, Cl. 62-63.000.
Lermuzeaux, Andre, 4,090,669, Cl. 241-8.000.
Laird, Richard J.; and Verrone, Patrick V., to Mesta Machine Co. Shroud lifting equipment. 4,090,552, Cl. 164-438.000.
Laliberte, Norman U., to American Optical Corporation. Mold for producing polarizing optical devices. 4,090,830, Cl. 425-117.000.
Lamb, Jeffrey Wayne. Fuel conservation controller for capacity controlled refrigeration apparatus. 4,090,372, Cl. 62-141.000.
Lance, Richard T.: *See*—
Papafingos, Pandelis N.; and Lance, Richard T., 4,090,916, Cl. 159-9.00A.
Land, Edwin H., to Polaroid Corporation. Multiple battery camera. 4,091,400, Cl. 354-202.000.
Landeroin-Duvernois, Odette. Process and a device for controlling the radiation-convection ratio in a heating apparatus. 4,091,263, Cl. 219-377.000.
Landess, John A.: *See*—
Maly, George P.; Landess, John A.; and Foral, Thomas, 4,090,562, Cl. 166-304.000.
Landis, Paul W., to Eli Lilly and Company. Automated sample changer for nuclear magnetic resonance spectrometer. 4,091,323, Cl. 324-.5AH.
Lang, John F.: *See*—
Kelly, Calvin E.; and Lang, John F., 4,090,599, Cl. 400-134.000.
Lang, Richard D.; and Bolton, Theodore S., to Carrier Corporation. Apparatus for controlling an internal door of an air conditioning unit. 4,090,373, Cl. 62-262.000.
Lange, Gerhard; and Peche, Gerhard, to Siemens Aktiengesellschaft. Knob type surge voltage arrester. 4,091,436, Cl. 361-120.000.
Lange, Hans-Jurgen: *See*—
von der Ohe, Walter; and Lange, Hans-Jurgen, 4,090,836, Cl. 425-574.000.
Lange, Norbert G., to Hooker Chemicals & Plastics Corp. Apparatus for multi-phase fluid systems. 4,090,530, Cl. 137-563.000.
Langhammer, Hans; and Loos, Hans, to Industriewerk Schaeffler OHG. Apparatus for production of cages. 4,090,687, Cl. 249-60.000.
Langley, Robert: *See*—
Barraclough, Ronald; and Langley, Robert, 4,091,028, Cl. 260-314.500.
Larko, Robert C.: *See*—
Smith, Jonathan; Larko, Robert C.; and Booth, Eugene E., 4,090,622, Cl. 214-18.00K.
Larsen, Ezra B.; Andrews, James R.; and Baldwin, Eugene E., to United States of America, Army. Broadband isotropic antenna with fiber-optic link to a conventional receiver. 4,091,327, Cl. 324-95.000.
LaTourrette, Peter Myers, to Wavecom Industries. Microwave multiplexer having resonant circuits connected in series with comb-line bandpass filters. 4,091,344, Cl. 333-73.00S.
Laub, Charles E. Balcony for use on exterior walls of buildings below windows. 4,090,585, Cl. 182-47.000.
Lausman, Thomas Clifford: *See*—
Wang, Chih Chun; Lausman, Thomas Clifford; and Bates, Ronald Frank, 4,090,758, Cl. 316-2.000.
Lavallee, Thomas F., to J.H. McDaniel Tele-Communications, Inc. Sonic monitoring method and apparatus. 4,091,366, Cl. 340-258.00R.
Laviana, Lawrence J., to M.H. Rhodes, Inc. Pneumatic control device. 4,090,531, Cl. 137-624.120.
Lavigne, Jean: *See*—
Gelin, Claude; and Lavigne, Jean, 4,091,440, Cl. 361-415.000.
Lazar, Ferenc: *See*—
Boros, Jozsef; Ferenczi, Tibor; Horvath, Gyula; Lazar, Ferenc; Lengyel, Laszlo; Matyasi, Jozsef; Orban nee Kelemen, Maria; Pinter, Tihamer; Sigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Bela; Voros, Istvan; Wentzely, Kalman; Zambo, Janos; and Zoldi, Jozsef, 4,091,071, Cl. 423-121.000.
Lebduska, Robert L., to United States of America, Navy. Photometric method and apparatus for measuring packing fraction of terminated fiber optic cables. 4,090,793, Cl. 356-205.000.
Lebleu, Albert; Fossi, Paul; and Demarthe, Jean-Michel, to Societe Miniere et Metallurgique de Penarroya. Process for the recovery and purification of germanium from zinc ores. 4,090,871, Cl. 75-84.500.
Lebovici, Victor. Remote control switching. 4,091,276, Cl. 250-214.00R.

Leclercq, Jacques: *See—*
Rodriguez, Ludovic; and Leclercq, Jacques, 4,091,027, Cl. 260-306.70C.

Leclere, Ralph Joseph: *See—*
Hubbard, James Henry; Leclere, Ralph Joseph; and Underhill, Thomas Travis, 4,090,787, Cl. 355-14.000.

Le Diouron, Raymond J. F., to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Method and an installation for the refrigeration by discontinuous charges of objects in bulk. 4,090,369, Cl. 62-63.000.

Lee, Albert: *See—*
Marcus, Ira R.; and Lee, Albert, 4,091,325, Cl. 324-51.000.

Lee, Don H.; Weller, Kenneth P.; and Thrower, William F., to Hughes Aircraft Company. High frequency ion implanted passivated semiconductor devices and mircowave intergrated circuits and planar processes for fabricating both. 4,091,408, Cl. 357-56.000.

Lee, Douglas C.; Ziemkiewicz, Leonard P.; Ardito, Victor P.; and Greco, Alex J., to Allegheny Ludlum Industries, Inc. Mold protection device for the bottom of ingot molds. 4,090,551, Cl. 164-137.000.

Lee, Harry Thomas: *See—*
Wolnowsky, Howard Ervin; Belland, Erling Norris; and Lee, Harry Thomas, 4,091,237, Cl. 179-1.0SC.

Leeds & Northrup Company: *See—*
Harkins, Samuel Jordan; and Johnson, Curtis Robert Alvin, 4,090,746, Cl. 308-26.000.

Leeson, Jeffrey S.: *See—*
Fox, Albert L.; Leeson, Jeffrey S.; and Szabo, Joseph F., 4,091,180, Cl. 429-84.000.

Leftheris, Basil P.; and Varisco, Angelo, to Grumman Aerospace Corporation. Stress wave generating coil. 4,091,260, Cl. 219-149.000.

Lehmann, Manfred, to Ludwig Bollmann KG. Device for inserting spacing strips between boards to be stacked. 4,090,618, Cl. 214-6.00M.

Lehmann, Rolf, to Escher Wyss Limited. Deflection control device. 4,090,282, Cl. 29-116.0AD.

Lehner, Walter H. Automobile door latch and lock protecting device and method for preventing freezing of door latches and locks. 4,090,379, Cl. 70-455.000.

LeMay, Christopher Archibald Gordon, to EMI Limited. Radiography. 4,091,289, Cl. 250-445.00T.

Lengyel, Laszlo: *See—*
Boros, Jozsef; Ferenczi, Tibor; Horvath, Gyula; Lazar, Ferenc; Lengyel, Laszlo; Matyasi, Jozsef; Orban nee Kelemen, Maria; Pinter, Tihamer; Sigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Bela; Voros, Istvan; Wentzely, Kalman; Zambo, Janos; and Zoldi, Jozsef, 4,091,071, Cl. 423-121.000.

Lenk, Gerd Gerry; and Paul, Robert Allen, to Motorola, Inc. Low microphonic circuit housing. 4,091,232, Cl. 174-52.00R.

Leonard, James L. Streamlined monolithic internal combustion engine muffler. 4,090,583, Cl. 181-240.000.

Leonard, Robert E., to Kerr-McGee Corporation. System for separating soluble and insoluble coal products from a feed mixture. 4,090,957, Cl. 210-54.000.

Leonard, Robert Edward, to Kerr-McGee Corporation. Coal processing system for producing a stream of flowable insoluble coal products. 4,090,958, Cl. 210-54.000.

Lermuzeaux, Andre, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Process for embrittling integuments of small seeds. 4,090,669, Cl. 241-8.000.

Leroy, Pierre: *See—*
Antoine, Lucien; Leroy, Pierre; and Saleil, Jean, 4,090,869, Cl. 75-12.000.

Les Cables de Lyon S.A.: *See—*
Ormili, Bernard; and Comte, Georges, 4,090,280, Cl. 29-33.00K.

Lesk, Israel Arnold, to Motorola, Inc. Solar energy collector. 4,090,495, Cl. 126-270.000.

Levering, Kenneth A.: *See—*
Allread, Alan R.; and Levering, Kenneth A., 4,090,524, Cl. 137-68.00R.

LeVert, Francis E.; and Cox, Samson A., to United States of America, Energy. Threshold self-powered gamma detector for use as a monitor of power in a nuclear reactor. 4,091,288, Cl. 250-370.000.

Levin, Mikhail Samuilovich: *See—*
Babasov, Mikhail Vladimirovich; Zazimko, Viktor Afanasievich; Reidemeister, Iraida Ivanovna; Semenenko, Jury Lukich; Pertsikov, Zelik Ilich; Levin, Mikhail Samuilovich; Eremeev, Valery Konstantinovich; and Varava, Leonid Mikhailovich, 4,090,381, Cl. 72-68.000.

Lewis, Frederick M.: *See—*
Kramer, Harold L.; and Lewis, Frederick M., 4,091,067, Cl. 264-222.000.

Lewis, William Newman, to RCA Corporation. Combination glass/low temperature deposited $Si_xN_yH_zO_z$ passivating overcoat with improved crack and corrosion resistance for a semiconductor device. 4,091,406, Cl. 357-54.000.

Leyerle, Richard W.: *See—*
Welsh, Lawrence B.; and Leyerle, Richard W., 4,090,978, Cl. 252-425.300.

Li, George S.; and Dirks, Gary W., to Standard Oil Company, The. Acrylonitrile-vinyl ether-indene or coumarone polymers. 4,091,199, Cl. 526-280.000.

Li, George S.: *See—*
Dirks, Gary W.; Li, George S.; and Jones, John F., 4,090,998, Cl. 260-63.00R.

Li, Tao P., to Monsanto Company. Dehydrocoupling process. 4,091,044, Cl. 260-668.00C.

Li, Tsi Tieh; and Saxon, Robert, to American Cyanamid Company. Vulcanizable elastomer from thiodiethanol and an oligomeric polyester. 4,091,002, Cl. 260-75.00S.

Licentia Patent-Verwaltungs-G.m.b.H.: *See—*
Heffler, Jochen, 4,091,177, Cl. 429-42.000.

Liggett Group Inc.: *See—*
Hall, Floyd Vanmeda, 4,090,424, Cl. 83-330.000.

Ligier, Michel: *See—*
Dupont, Jean-Pierre; Gregoire, Jean-Francois; Ligier, Michel; and Roy, Jacques, 4,090,404, Cl. 73-119.00A.

Lileck, John Theodore: *See—*
Woytek, Andrew Joseph; and Lileck, John Theodore, 4,091,081, Cl. 423-406.000.

Lim-Holding S.A.: *See—*
Schmidt, Oskar, 4,090,547, Cl. 152-354.00R.
Schmidt, Oskar, 4,091,000, Cl. 260-75.0NQ.

Limb, John Ormond; and Roos, Charles Edwin, to Bell Telephone Laboratories, Incorporated, a part interest. Method and apparatus for detecting temporal changes in an object. 4,091,415, Cl. 358-105.000.

Lin, Kingso C.; and Hammond, Donald J., to Owens-Corning Fiberglas Corporation. Semi-conductive coating for glass fibers. 4,090,984, Cl. 252-511.000.

Lindberg, Ramon I.: *See—*
Foster, Walter W.; French, William H.; and Lindberg, Ramon I., 4,091,291, Cl. 307-95.000.

Lindberg, Torsten Gunnar: *See—*
Wedin, Sten Henrik; and Lindberg, Torsten Gunnar, 4,090,721, Cl. 280-5.00A.

Linde Aktiengesellschaft: *See—*
Watson, Alan; Hohmann, Peter; Schmid, Herbert; and Schneider, Helmut, 4,091,008, Cl. 260-450.000.

Lindenschmidt, Robert Edward, to Whirlpool Corporation. Refrigerator ice door mechanism. 4,090,641, Cl. 222-70.000.

Lindskog, Per Folke: *See—*
Tengzelius, Jan Robert; Lindskog, Per Folke; and Svensson, Lars-Erik, 4,090,868, Cl. 75-0.50R.

Lippsmeier, Bernd: *See—*
Vollmer, Hartfrid; Elsner, Georg; Lippsmeier, Bernd; and Hestermann, Klaus, 4,091,012, Cl. 260-465.100.

List, Franz; and Scheul, Franz, to Heilmann & Littmann, Bau-Aktiengesellschaft. Dam of earth or rock fill having impervious core. 4,090,363, Cl. 61-31.000.

Litton Business Systems, Inc.: *See—*
Wu, Paul S.; and Tandon, Jagdish C., 4,091,379, Cl. 340-347.0AD.

Lobb, Daniel Richard. Moveable optical probe for viewing a scale model with image tilting. 4,090,775, Cl. 350-50.000.

Lockheed Missiles & Space Company, Inc.: *See—*
Wolnowsky, Howard Ervin; Belland, Erling Norris; and Lee, Harry Thomas, 4,091,237, Cl. 179-1.0SC.

Loewe-Opta GmbH: *See—*
Richter, Heinz; and Peetz, Heinz, 4,091,272, Cl. 250-199.000.

Logan, Allan Beattie; Marsh, Robin Geoffrey; and Fleming, Ian Alexander, to EMI Limited. Traverse and rotate CT scanner having rotational step through a multiple of the fan angle. 4,091,285, Cl. 250-360.000.

Logan, Allan Beattie; Marsh, Robin Geoffrey; and Fleming, Ian Alexander, to EMI Limited. Radiography apparatus wherein interleaving of beam paths is effected by changing the phase of the timing pulses. 4,091,286, Cl. 250-360.000.

Logan, Arthur D., to Dayco Corporation. Hose construction and method of making same. 4,091,063, Cl. 264-94.000.

Logic Devices, Inc.: *See—*
Allen, Paul E., 4,091,069, Cl. 264-328.000.

Loiacono, Carmelo. Smoke ring box. 4,090,320, Cl. 46-9.000.

London Brick Buildings Limited: *See—*
Attwell, Ronald Leslie, 4,090,827, Cl. 425-64.000.

Long, Gregor Dean, to Baxter Travenol Laboratories, Inc. Diagnostic electrode assembly. 4,090,752, Cl. 312-42.000.

Long-Lok Fasteners Corporation: *See—*
Bagheri, Mansour A. H.; and Stillman, Donald W., 4,090,544, Cl. 151-14.00R.

Long, Michael E., to Zenith Radio Corporation. Television AFC system having complementary sound and picture carrier control effects. 4,091,421, Cl. 358-195.000.

Look, Lance G.; and Erickson, David G., to United States of America, Air Force. Stowable airfoil structure. 4,090,684, Cl. 244-218.000.

Loos, Hans: *See—*
Langhammer, Hans; and Loos, Hans, 4,090,687, Cl. 249-60.000.

Lostutter, Rollie, to Lostutter, Rollie. Method and apparatus for tinting caulk. 4,090,612, Cl. 211-13.000.

Lovegrove, Brian Walter, to Fisons Limited. Device. 4,090,661, Cl. 233-1.00R.

Lowery, Kirby, Jr.: *See—*
Gessell, Donald Earl; and Lowery, Kirby, Jr., 4,091,082, Cl. 423-413.000.

Lubrizol Corporation, The: *See—*
Davis, Kirk Emerson, 4,090,854, Cl. 44-73.000.
Hoke, Donald Irvin, 4,090,971, Cl. 252-51.50A.

Lucas Industries Limited: *See—*
Lynch, Ronald; and Purcell, John Harold, 4,091,300, Cl. 310-154.000.

Luce, David A., to Norlin Music, Inc. Contour generator for audio signal. 4,090,426, Cl. 84-1.260.

Ludwig Bollmann KG: *See—*
Lehmann, Manfred, 4,090,618, Cl. 214-6.00M.

Ludwig, Robert L., to United States of America, Energy. Ductile

tungsten-nickel-alloy and method for manufacturing same. 4,090,875, Cl. 75-248.000.

Luedtke, Arthur; and Bentley, William Ferrel, to United States of America, Federal Communications Commission. Rear window direction finding antenna. 4,091,386, Cl. 343-713.000.

Luginbuhl, Pierre, to Sig Schweizerische Industrie-Gesellschaft. Apparatus for rejecting excessively thick articles. 4,090,610, Cl. 209-74.00R.

Lumb, Ernest C.: *See*—
Clayfield, Eric J.; Lumb, Ernest C.; and Wilbraham, Kenneth J., 4,090,853, Cl. 44-51.000.

Lumma, William C., Jr., to Merck & Co., Inc. 3-(1-piperazinyl)-1,2,4-benzotriazines and N-oxides. 4,091,098, Cl. 424-249.000.

Lumma, William C., Jr.; and Saari, Walfred S., to Merck & Co., Inc. 6-(1-Piperazinyl)quinoxaline. 4,091,101, Cl. 424-250.000.

Luna, Miguel L. Frying utensil. 4,090,438, Cl. 99-441.000.

Lurssen, Klaus: *See*—
Thomas, Rudolf; and Lurssen, Klaus, 4,090,862, Cl. 71-98.000.

Luther, Holger Martin: *See*—
Mendelsohn, Charles; and Luther, Holger Martin, 4,091,311, Cl. 315-382.000.

Luwa AG: *See*—
Ferri, Johann Walter; and Sutter, Hanspeter, 4,090,857, Cl. 55-337.000.

Lybarger, James H.; Richardson, Edwin A.; Scheuerman, Ronald F.; and Templeton, Charles C., to Shell Oil Company. Increasing the clay dissolving capability of a buffer-regulated mud acid. 4,090,563, Cl. 166-307.000.

Lynch, Ronald; and Purcell, John Harold, to Lucas Industries Limited. Permanent magnet electrical machines. 4,091,300, Cl. 310-154.000.

Lynch, William Thomas, to Bell Telephone Laboratories, Incorporated. Dynamic precharge circuitry. 4,091,360, Cl. 340-166.00R.

Lyons, Dorothy Flentie. Method and apparatus for teaching dyslexic children. 4,090,311, Cl. 35-35.00R.

Lyons, James Edward, to Suntech, Inc. Methyl 1,1,3,3-tetramethylbutyl ether. 4,090,885, Cl. 106-170.000.

M.C.P. Industries, Inc.: *See*—
Hage, Jacob M., 4,091,173, Cl. 85-41.000.

M.H. Rhodes, Inc.: *See*—
Laviana, Lawrence J., 4,090,531, Cl. 137-624.120.

Maag Gear-Wheel & Machine Company Limited: *See*—
Mischler, Eduard, 4,090,330, Cl. 51-123.00G.

Macemon, James H.; and Soodak, Charles, to Baxter Travenol Laboratories, Inc. Cuvette positioning device for optical analytical apparatus. 4,090,789, Cl. 356-85.000.

Mada, Mitsuo: *See*—
Mutai, Masahiko; Mada, Mitsuo; Nakajima, Kei; Takahashi, Shusei; Nakao, Takashi; Shimada, Kiyohiro; and Iijima, Takashi, 4,091,117, Cl. 426-43.000.

Maeda, Hidetoshi; and Sasaki, Takehiko, to Sharp Kabushiki Kaisha. Touch switch controlled time information correction with safety lock in an electronic wristwatch. 4,090,353, Cl. 58-85.500.

Maekawa, Koji; and Hamasaki, Iwao, to Sharp Kabushiki Kaisha. Driving circuits for a multi-digit gas discharge panel. 4,091,376, Cl. 340-336.000.

Mages, Bernhard: *See*—
Rock, Erich; and Mages, Bernhard, 4,090,753, Cl. 312-140.000.

Maggi, Charles Robert, to International Telephone and Telegraph Corporation. CVSD digital adder. 4,091,452, Cl. 364-768.000.

Magnagard Equipment Manufacturing Corporation: *See*—
Putnam, Dean H., 4,091,403, Cl. 354-300.000.

Maguire, Edward John, Jr.; and Pancheri, Eugene J., to Procter & Gamble Company, The. Method for making stable detergent compositions. 4,090,973, Cl. 252-89.00R.

Magyar, Karoly: *See*—
Benko, Pal; Simonek, Ildiko; Pallos, Laszlo; Kovacs, Jeno; and Magyar, Karoly, 4,091,206, Cl. 542-416.000.

Mahoney, Christopher I., to Distribution Systems, Inc. Labelling. 4,090,904, Cl. 156-215.000.

Mallet, Gilbert, to Societe Ciuile Particuliere Cominda Engineering. Compounds for forming bodies for generating heat from radiant luminous energy, and methods of preparation and applications thereof. 4,090,496, Cl. 126-271.000.

Malott, Roger James: *See*—
Jovick, Raymond John; and Malott, Roger James, 4,090,592, Cl. 188-181.00R.

Malsby, Marc W.; and Willey, Norman W., to Deutsch Company Electronic Components Division, The. Modular electrical connector. 4,090,764, Cl. 339-103.00M.

Maly, George P.; Landess, John A.; and Foral, Thomas, to Union Oil Company of California. Method and solvent composition for stimulating the production of oil from a producing well. 4,090,562, Cl. 166-304.000.

Mammen, H. William: *See*—
Roszyk, Leon M.; Mammen, H. William; and Buchner, John B., 4,091,317, Cl. 318-369.000.

Man Design Co., Ltd.: *See*—
Takahashi, Shiro, 4,090,816, Cl. 417-371.000.

Manchem Limited: *See*—
Turner, John Harry Wallice, 4,090,886, Cl. 106-264.000.

Manghisi, Elso; Salimbeni, Aldo; and Mennella, Pietro. 2,2 Disubstituted-benzodioxoles. 4,091,222, Cl. 544-148.000.

Manus, Eugene A.: *See*—
United States of America, National Aeronautics and Space Administration; Wiley, Paris H.; and Manus, Eugene A., 4,091,329, Cl. 328-145.000.

Marchessaux, Philippe: *See*—
Reh, Lothar; Plass, Ludolf; and Marchessaux, Philippe, 4,091,085, Cl. 423-625.000.

Marcus, Ira R.; and Lee, Albert, to United States of America, Army. Verification technique for checking wrapped wire electronic boards. 4,091,325, Cl. 324-51.000.

Marcus, Melvin Arnold: *See*—
Fuller, William Brewster; Potter, Edwin F., Jr.; and Marcus, Melvin Arnold, 4,091,273, Cl. 250-199.000.

Marendaz, Georges-Andre: *See*—
Rhyner, Heinz; Balleys, Francois; and Marendaz, Georges-Andre, 4,090,961, Cl. 219-69.00C.

Marion Health & Safety, Inc.: *See*—
Kramer, Harold L.; and Lewis, Frederick M., 4,091,067, Cl. 264-222.000.

Marioni, Peter Paul. Multicolored glass objects and process for production. 4,091,132, Cl. 428-35.000.

Markey, John Webb. Trailer light. 4,091,442, Cl. 362-61.000.

Marklund, Erland, to Renholmens Mekaniska Verkstad AB. Collecting arrangement. 4,090,603, Cl. 198-460.000.

Marquardt, Robert F.: *See*—
Goodnight, Kenneth C., Jr.; Hartman, Grant H., Jr.; and Marquardt, Robert F., 4,091,120, Cl. 426-598.000.

Marquette Electronics, Inc.: *See*—
Mortara, David W., 4,090,505, Cl. 128-2.06G.

Marquisee, Mark James; and Sandell, Lionel Samuel, to Du Pont de Nemours, E. I., and Company. Pigmented microporous silica microspheres produced by a water in oil emulsion. 4,090,887, Cl. 106-288.00B.

Marsh, Richard A.: *See*—
Erisman, Lester R.; and Marsh, Richard A., 4,091,184, Cl. 429-139.000.

Marsh, Robin Geoffrey: *See*—
Logan, Allan Beattie; Marsh, Robin Geoffrey; and Fleming, Ian Alexander, 4,091,285, Cl. 250-360.000.
Logan, Allan Beattie; Marsh, Robin Geoffrey; and Fleming, Ian Alexander, 4,091,286, Cl. 250-360.000.

Marshall, Larry A.; and Murdock, Alexander Hamilton, to Dow Badische Canada Limited. Fixed cutting element. 4,090,674, Cl. 241-221.000.

Martin, Albert Edward, to Dresser Industries, Inc. Coupler knuckle assembly. 4,090,615, Cl. 213-151.000.

Martin, Frank S.; and Pietraszek, Thaddeus A., to Uniroyal, Inc. Golf ball. 4,090,716, Cl. 273-232.000.

Martin, Gayle P., to United States of America, Air Force. Low offset AC correlator. 4,091,453, Cl. 364-819.000.

Martin, Jerry Roy: *See*—
Tadanier, John Soloman; Martin, Jerry Roy; and Kurath, Paul, 4,091,032, Cl. 260-345.80R.

Martin, Luther W.; and Smith, Richard L. Live gas main insertions. 4,090,534, Cl. 138-97.000.

Martin, Roy C.: *See*—
Hay, Warren H.; Kimball, Stephen F.; and Martin, Roy C., 4,090,292, Cl. 29-623.000.

Martin, Roy E.: *See*—
Musch, Bernard E.; and Martin, Roy E., 4,091,270, Cl. 235-419.000.

Maruoka, Sigehiro: *See*—
Tsukisaka, Tsuneo; and Maruoka, Sigehiro, 4,090,634, Cl. 220-302.000.

Marvel Metal Products Company: *See*—
Johnson, Frank S., 4,090,755, Cl. 312-257.00R.

Masakazu, Kurashige: *See*—
Tadataka, Chiba; and Masakazu, Kurashige, 4,091,303, Cl. 310-343.000.

Maschinenfabrik Wifag: *See*—
Von Hein, Eduard, 4,090,701, Cl. 270-21.000.

Masetti, William R., to General Atomic Company. Spacer structure. 4,090,918, Cl. 176-78.000.

Mason, Gary E., to Caterpillar Tractor Co. Scraper bowl lifting brackets. 4,090,314, Cl. 37-124.000.

Mason, Stanley I., Jr.; and Pfeifer, John E., to Simco, Inc. Touch-responsive portable intrusion alarm. 4,091,371, Cl. 340-274.00R.

Massengeil, Hans A., to Agfa-Gevaert Aktiengesellschaft. Optical copying machine. 4,090,788, Cl. 355-71.000.

Massucci, Josephine Vicari; and Parlak, Rosemary Anne. Ornamental fabric. 4,090,300, Cl. 33-1.00R.

Masuda, Akira: *See*—
Itoh, Yukinori; Shibata, Mituhiko; Masuda, Akira; Ohtake, Yasuo; and Etoh, Motoaki, 4,090,484, Cl. 123-127.000.

Masuyama, Masami; and Edo, Tsukasa, to Kabushiki Kaisha Daini Seikosha. Automatic pencil apparatus for an automated drafting system. 4,091,393, Cl. 346-139.00C.

Mathiassen, Svein: *See*—
Hoel, Eivin; and Mathiassen, Svein, 4,090,560, Cl. 166-.600.

Matinlassi, Ulf A.: *See*—
Naylor, Tom D.; and Matinlassi, Ulf A., 4,090,386, Cl. 72-208.000.

Matson, Wayne R., to Environmental Sciences, Inc. Testing product. 4,090,926, Cl. 204-1.00T.

Matsuda, Motonobu: *See*—
Sahara, Masayoshi; Matsuda, Motonobu; and Ohta, Yoshiharu, 4,091,396, Cl. 354-23.00D.

Matsui, Masatake: *See*—
Kakinuma, Mitsuo; Motegi, Isoji; Matsui, Yasuo; Matsui, Masatake; Ohtsuju, Masaaki; Takahashi, Kiyoshi; and Fukuda, Takeo, 4,091,064, Cl. 264-174.000.

Matsui, Takashi, to Sekisui Kaseihin Kogyo Kabushiki. Apparatus and

method for manufacturing a container from a thermoplastic resin foam sheet. 4,090,903, Cl. 156-211.000.

Matsui, Yasuo: *See—*
Kakinuma, Mitsuo; Motegi, Isoji; Matsui, Yasuo; Matsui, Masatake; Ohtsuju, Masaaki; Takahashi, Kiyoshi; and Fukuda, Takeo, 4,091,064, Cl. 264-174.000.

Matsumoto, Shiro; Shishido, Jiro; and Fukumoto, Toshitsugu, to Japan Steel Works, The. Swash plate type compressor. 4,090,430, Cl. 92-71.000.

Matsumoto, Yoshimitsu: *See—*
Tanaka, Masaru; and Matsumoto, Yoshimitsu, 4,091,259, Cl. 219-137.00R.

Matsuo, Aritsune: *See—*
Takamura, Masayuki; Matsuo, Aritsune; and Iijima, Kenzaburo, 4,090,873, Cl. 75-208.00R.

Matsushita Electric Industrial Co., Ltd.: *See—*
Ito, Shinichi; Tanaka, Toshiharu; and Wakabayashi, Noriaki, 4,091,266, Cl. 219-504.000.
Nakajima, Masaya; and Tabuchi, Katsumi, 4,091,357, Cl. 340-5.00R.
Ohta, Takeo; Takenaga, Mutsuc; Akahira, Nobuo; Yamada, Noboru; and Yamashita, Tadaoki, 4,091,171, Cl. 428-539.000.
Tanaka, Masaru; and Matsumoto, Yoshimitsu, 4,091,259, Cl. 219-137.00R.
Yamamoto, Terumasa; Miyagawa, Katsuhiko; Kunishige, Hidenori; and Nakao, Fusafumi, 4,091,284, Cl. 250-337.000.

Matsushita Electric Works, Ltd.: *See—*
Nishimura, Hiromi; Ono, Kenji; and Shibata, Minoru, 4,091,346, Cl. 335-78.000.

Matuo, Yuhsi: *See—*
Chibata, Ichiro; Tosa, Tetsuya; Mori, Takao; Watanabe, Taizo; Sano, Ryujiro; and Matuo, Yuhsi, 4,090,919, Cl. 195-63.000.

Matyasi, Jozsef: *See—*
Boros, Jozsef; Ferenczi, Tibor; Horvath, Gyula; Lazar, Ferenc; Lengyel, Laszlo; Matyasi, Jozsef; Orban nee Kelemen, Maria; Pinter, Tihamer; Sigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Bela; Voros, Istvan; Wentzely, Kalman; Zambo, Janos; and Zoldi, Jozsef, 4,091,071, Cl. 423-121.000.

Max-Planck-Gesellschaft zur Forderung der Wissenschaftern e.v.: *See—*
Doblhofer, Karl, 4,091,277, Cl. 250-214.00R.

May, Christian: *See—*
Hestermann, Klaus; Stengel, Jurgen; Heymer, Gero; and May, Christian, 4,091,078, Cl. 423-299.000.

Mazzie, John A.: *See—*
Rose, Millard F.; and Mazzie, John A., 4,090,448, Cl. 102-70.2GA.

MCA Technology, Inc.: *See—*
Dakin, Wayne Ray, 4,091,425, Cl. 360-38.000.

McArthur, Dennis P., to Union Oil Company of California. Exhaust gas conversion process and catalyst. 4,091,072, Cl. 423-213.500.

McCall, Richard J. Mailing carton for books. 4,090,607, Cl. 206-424.000.

McCall, Richard J. Mailing carton with cover for books. 4,090,608, Cl. 206-424.000.

McCann, John: *See—*
Bagshaw, Trevor; and McCann, John, 4,091,253, Cl. 219-76.140.

McCartney, Michael Scott, to Combustion Engineering, Inc. Boiler start-up air heater. 4,090,455, Cl. 110-232.000.

McCauley, Lewis D. Vehicle wheel disc locking means. 4,090,744, Cl. 301-37.0AT.

McConaghy, John S., Jr.: *See—*
Keppel, Robert A.; and McConaghy, John S., Jr., 4,091,019, Cl. 260-585.00R.

McConnell, Bobby Lee; Thornton, Raymond; and Graham, Louis Atkins, to Burlington Industries, Inc. Triazine dyes reactive through their phosphorus acid groups. 4,091,004, Cl. 260-153.000.

McCutcheon, Hugh W.: *See—*
Hancock, George A.; and McCutcheon, Hugh W., 4,090,397, Cl. 73-73.000.

McDonald, William H., to PPG Industries, Inc. Method for the preparation of mixtures of (meth)acrylic terminated polyether resin and 3-halo-2-hydroxypropyl (meth)acrylate. 4,091,050, Cl. 260-837.00R.

McDonnell Douglas Corporation: *See—*
Anderson, John H.; and Waters, Elmer D., 4,090,555, Cl. 165-76.000.

McDowell, Donald J.: *See—*
Patel, Purshottam S.; and McDowell, Donald J., 4,090,997, Cl. 260-47.0UA.

McElwaine, David C., to Polaroid Corporation. Apparatus for facilitating ready insertion and removal of cassettes from wells. 4,090,784, Cl. 352-74.000.

McGee, John K., to Gray Tool Company. Control line tubing hanger. 4,090,565, Cl. 166-315.000.

McIntyre, Donald B.; and McIntyre, Frederic S., to Acumeter Laboratories, Inc. Method of and apparatus for adhering sheet material wrappings and the like. 4,090,520, Cl. 131-29.000.

McIntyre, Frederic S.: *See—*
McIntyre, Donald B.; and McIntyre, Frederic S., 4,090,520, Cl. 131-29.000.

McIntyre, George W.: *See—*
Ehresman, Virgil Alphonse; and McIntyre, George W., 4,091,456, Cl. 364-900.000.

McKee, Fount E., to Delta-X Corporation. Polished rod load transducer. 4,090,405, Cl. 73-151.000.

McKee, William H.; and Witte, Roy, to TRW Inc. Connector cover construction. 4,090,770, Cl. 339-206.00R.

McKernan, Patrick F.: *See—*
Diamond, Joseph M.; Kuzmik, Joseph T.; Teass, Horace A., Jr.; and McKernan, Patrick F., 4,091,324, Cl. 324-30.00B.

McKinney, Gordon W., to Peripheral Sciences, Inc. Method and apparatus for sorting documents. 4,090,611, Cl. 209-111.800.

McKinnon, Donald C.: *See—*
Buhr, George A.; Borowicz, Joseph J.; and McKinnon, Donald C., 4,090,766, Cl. 339-113.00L.

McLaughlin, Michael H.: *See—*
Fisk, Robert W.; and McLaughlin, Michael H., 4,091,353, Cl. 337-204.000.

McLennan, Ronald A. Variable length anchoring device for vehicle seats. 4,090,580, Cl. 180-103.0BF.

McNab, Incorporated: *See—*
Diamond, Joseph M.; Kuzmik, Joseph T.; Teass, Horace A., Jr.; and McKernan, Patrick F., 4,091,324, Cl. 324-30.00B.

McNamara, Albert C., Jr., to Esquire, Inc. Emergency lighting system for gaseous-discharge lamps. 4,091,307, Cl. 315-92.000.

McNaney, Joseph T. Light beam position control system. 4,090,779, Cl. 350-355.000.

McPeak, Walter G. Apparatus for marking football fields. 4,090,708, Cl. 273-55.00R.

McPherson, Bruce M., to NCR Corporation. Storage device. 4,090,613, Cl. 211-69.500.

McPherson, Charles Allen, to Western Electric Company, Inc. Cured epoxy polymer having improved adhesive properties. 4,091,127, Cl. 427-304.000.

Mead Corporation, The: *See—*
Davis, Gerald Titus; and Shackle, Dale Richard, 4,091,122, Cl. 427-44.000.

Mead Johnson & Company: *See—*
Goodnight, Kenneth C., Jr.; Hartman, Grant H., Jr.; and Marquardt, Robert F., 4,091,120, Cl. 426-598.000.

Mecafina SA: *See—*
Fuchs, Ernst, 4,090,965, Cl. 210-151.000.

Meckstroth, Robert C.; and Boshinski, Edwin E., to Hobart Corporation. Computing scale system. 4,091,449, Cl. 364-466.000.

Medical Institute of Hoshokai: *See—*
Tajika, Akeo, 4,090,502, Cl. 128-2.00A.

Medical Specialties, Incorporated: *See—*
Gaylord, John F., Jr., 4,090,508, Cl. 128-80.00C.

Medina Plastic Products, Inc.: *See—*
Szekeres, John M., 4,090,337, Cl. 52-309.100.

Mee, Gary Lynn: *See—*
Weiner, Peter D.; Calhoun, Charles W.; Collins, Jerry A.; and Mee, Gary Lynn, 4,091,451, Cl. 364-506.000.

Megerlin, Ferdi E., to United States of America, Navy. Heat transfer device. 4,090,559, Cl. 165-179.000.

Mehta, Nariman Bomanshaw; and Brieaddy, Lawrence Edward, to Burroughs Wellcome Co. Sulfide compounds. 4,091,100, Cl. 424-250.000.

Mendelsohn, Charles; and Luther, Holger Martin, to United Technologies Corporation. Modulatable, hollow beam electron gun. 4,091,311, Cl. 315-382.000.

Mennella, Pietro: *See—*
Manghisi, Elso; Salimbeni, Aldo; and Mennella, Pietro, 4,091,222, Cl. 544-148.000.

Merck & Co., Inc.: *See—*
Baldwin, John J., 4,091,104, Cl. 424-263.000.
Cragoe, Edward J., Jr.; and Jones, James H., 4,091,107, Cl. 424-274.000.
Graham, Donald W.; and Rogers, Edward F., 4,091,094, Cl. 424-180.000.
Grier, Nathaniel; and Dybas, Richard A., 4,091,020, Cl. 260-586.00C.
Lumma, William C., Jr., 4,091,098, Cl. 424-249.000.
Lumma, William C., Jr.; and Saari, Walfred S., 4,091,101, Cl. 424-250.000.
Rokach, Joshua; Rooney, Clarence S.; Reader, Grant W.; and Cragoe, Edward J., Jr., 4,091,105, Cl. 424-270.000.

Merianos, John J.: *See—*
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., 4,091,113, Cl. 424-329.000.

Merit Abrasive Products, Inc.: *See—*
Block, Aleck; and Hasegawa, Hiroshi, 4,090,333, Cl. 51-336.000.

Merritt, Ben Gilbert, Jr., to Union Carbide Corporation. Rechargeable galvanic cell. 4,091,181, Cl. 429-94.000.

Mese, Michihiro: *See—*
Kashioka, Seiji; Ejiri, Masakazu; Mese, Michihiro; Miyatake, Takafumi; Hamada, Toshimitsu; and Yamazaki, Isamu, 4,091,394, Cl. 340-146.30H.

Mesta Machine Co.: *See—*
Laird, Richard J.; and Verrone, Patrick V., 4,090,552, Cl. 164-438.000.

Metallwerk Max Brose GmbH & Co.: *See—*
Rampel, Hans, 4,090,329, Cl. 49-352.000.

Mettler Instrumente AG: *See—*
Kunz, Peter; and Strobel, Felix, 4,090,575, Cl. 177-210.0EM.

Metzler, Jay C., to Schlegel Corporation. Apparatus for making pile weatherstripping. 4,090,910, Cl. 156-430.000.

Meyers, Edward: *See—*
Parker, William L.; Meyers, Edward; Nimeck, Maxwell W.; and Brown, William E., 4,091,092, Cl. 424-118.000.

Micetich, Ronald G.; Chin, Clinton G.; and Morin, Robert B., to Connlab Holdings Limited. Thiazoleneazetidinones from dithiazeneazetidinones. 4,091,026, Cl. 260-306.70C.

Michel, Raymond; and Whitwham, Donald, to Trefimetaux. Apparatus and method of circulating a gas through coils of very long tubing during a heat treatment. 4,090,699, Cl. 266-252.000.

Miley, George H.; Wells, William E.; and DeYoung, Russell J., to United States of America, Energy. Direct nuclear pumped laser. 4,091,336, Cl. 331-94.50P.

Miller, Joe A.: *See—*
Cammarata, Frank, III; Miller, Joe A.; and Ralston, Philip G., Jr., 4,090,541, Cl. 150-.500.

Miller, John James: *See—*
Edwards, Ronald Alexander Nixon; Cantrell, Peter Morris; and Miller, John James, 4,091,116, Cl. 426-42.000.

Miller, Philip Eugene, to Du Pont de Nemours, E. I., and Company. Porous nonwoven film-fibril sheet having optical transmission properties. 4,091,137, Cl. 428-198.000.

Miller, Richard G., to PPG Industries, Inc. Uniform gold films. 4,091,172, Cl. 428-630.000.

Miller, Stephen K.: *See—*
Borst, Walter L.; Miller, Stephen K.; and Kane, Michael B., 4,090,494, Cl. 126-270.000.

Milliken Research Corporation: *See—*
Kuhn, Hans Heinrich, 4,091,034, Cl. 260-391.000.

Minato, Akira; Shimizu, Tutomu; and Kanekiyo, Yosio, to Hitachi, Ltd. High-efficiency turbo-machine impellers. 4,090,813, Cl. 416-184.000.

Minck, Robert W., to Ford Motor Company. Secondary battery or cell with improved rechargeability. 4,091,151, Cl. 429-104.000.

Mine Safety Appliances Company: *See—*
Gray, Robert Elder, 4,090,511, Cl. 128-147.000.

Miner, Earl L.; and Jones, Harold G., to Detroit Tool and Engineering Company. Carrier vehicle steering system. 4,090,581, Cl. 180-140.000.

Minick, David G., to Sinclair Company, The. Ultrasonic welding of thermoplastic fabrics. 4,090,897, Cl. 156-73.100.

Minnesota Mining and Manufacturing Company: *See—*
Barton, Robert W., 4,090,936, Cl. 204-159.180.
Fayling, Richard E., 4,090,662, Cl. 235-493.000.
Roelofs, Glenn E., 4,091,150, Cl. 428-57.000.
Streeper, Richard D., 4,090,877, Cl. 96-27.00E.

Minolta Camera Kabushiki Kaisha: *See—*
Sahara, Masayoshi; Matsuda, Motonobu; and Ohta, Yoshiharu, 4,091,396, Cl. 354-23.00D.

Minster Machine Company, The: *See—*
Olding, Michael J.; Fortman, Ronald F.; and Stewart, William J., 4,091,438, Cl. 361-189.000.

Mir Puig, Pedro. Process for the production of urea-formaldehyde adhesives or resins and products obtained thereby. 4,090,999, Cl. 260-69.00R.

Mirbach, Erich: *See—*
Bohg, Armin; Ebert, Eckehard; and Mirbach, Erich, 4,091,169, Cl. 428-428.000.

Mischel, Howard T. Flexible coupling for conduits. 4,090,726, Cl. 285-229.000.

Mischler, Eduard, to Maag Gear-Wheel & Machine Company Limited. Correction device for the rolling type tension on a gear grinding machine. 4,090,330, Cl. 51-123.00G.

Mitamura, Kazuyoshi; and Itoh, Hiroyuki, to Nippon Oil Company Limited. Water-soluble polymers derived from copolymerization of diene and maleic acid or maleic acid derivative and aqueous quenching fluids prepared therefore. 4,090,891, Cl. 148-28.000.

Mitor, Vyacheslav Vladimirovich: *See—*
Golovanov, Nikolai Vasilievich; Ivanov, Vitaly Alexandrovich; Mitor, Vyacheslav Vladimirovich; Parshin, Anatoly Alexeevich; Sapozhnikov, Fedor Vasilievich; Ter-Minosian, Sergei Mikhailovich; and Chavchanidze, Evgeny Kirillovich, 4,090,473, Cl. 122-6.00A.

Mitsubishi Chemical Industries Limited: *See—*
Kikumoto, Ryoji; Tobe, Akihiro; Tonomura, Shinji; and Ikoma, Hidenobu, 4,091,114, Cl. 424-330.000.

Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Yamamoto, Shigeru; and Miwa, Takashi, 4,090,401, Cl. 73-91.000.

Mitsubishi Petrochemical Co., Ltd.: *See—*
Hayama, Kazuhide, 4,091,165, Cl. 428-409.000.

Mitsubishi Petrochemical Co., Ltd: *See—*
Kakinuma, Mitsuo; Motegi, Isoji; Matsui, Yasuo; Matsui, Masatake; Ohtsuju, Masaaki; Takahashi, Kiyoshi; and Fukuda, Takeo, 4,091,064, Cl. 264-174.000.

Miwa, Takashi: *See—*
Yamamoto, Shigeru; and Miwa, Takashi, 4,090,401, Cl. 73-91.000.

Miyagawa, Katsuhiko: *See—*
Yamamoto, Terumasa; Miyagawa, Katsuhiko; Kunishige, Hidenori; and Nakao, Fusafumi, 4,091,284, Cl. 250-337.000.

Miyatake, Takafumi: *See—*
Kashioka, Seiji; Ejiri, Masakazu; Mese, Michihiro; Miyatake, Takafumi; Hamada, Toshimitsu; and Yamazaki, Isamu, 4,091,394, Cl. 340-146.30H.

Mizrahi, Albert; Moyer, Neal John; and Pezzutti, David August, to Bell Telephone Laboratories, Incorporated. Multifrequency signal receiver. 4,091,243, Cl. 179-84.0VF.

Mizuki, Yoshiaki, to Nihon Beru-Haueru Kabushiki Kaisha (Bell & Howell Japan, Ltd.). Pinch roller actuating device. 4,090,783, Cl. 352-27.000.

Mobil Oil Corporation: *See—*
Braid, Milton, 4,090,970, Cl. 252-42.700.
Bridger, Robert F.; Audeh, Costandi A.; and Heiba, El-Ahmadi I., 4,090,953, Cl. 208-177.000.
Dwyer, Francis G.; and Schwartz, Albert B., 4,091,007, Cl. 260-448.00C.
Kelly, John, Jr.; and Roper, Wilbur F., 4,090,523, Cl. 134-18.000.

Mobil Oil Corportion: *See—*
Owen, Hartley; and Venuto, Paul B., 4,090,949, Cl. 208-78.000.

Mobile Oil Corporation: *See—*
Rodewald, Paul G., 4,090,981, Cl. 252-455.00Z.

Moczygemba, George A., to Phillips Petroleum Company. Block copolymers of alkadienes and monovinyl arenes. 4,091,051, Cl. 260-880B.

Moertel, George B., to Textron Inc. Apparatus for making slide fastener. 4,090,832, Cl. 425-391.000.

Mojonnier Bros. Co.: *See—*
Witt, Chester J.; and Thompson, Richard M., 4,090,526, Cl. 137-209.000.

Molins Limited: *See—*
Davies, Robert William; Pratt, Frederick; and Pearse, Michael Gordon, 4,090,912, Cl. 156-502.000.

Moll, Norman G.; and Quarderer, George J., to Dow Chemical Company, The. Coal hydrogenation catalyst recycle. 4,090,943, Cl. 208-10.000.

Monahan, Earnest M.: *See—*
Woods, John M.; Porter, Marion G.; and Monahan, Earnest M., 4,091,455, Cl. 364-200.000.

Monsanto Company: *See—*
Keppel, Robert A.; and McConaghy, John S., Jr., 4,091,019, Cl. 260-585.00R.
Li, Tao P., 4,091,044, Cl. 260-668.00C.
Schultz, Robert G., 4,091,038, Cl. 568-729.000.

Montagna, Angelo A.: *See—*
Beuther, Harold; and Montagna, Angelo A., 4,090,942, Cl. 208-8.000.

Montavon, Marc; and Reiner, Roland, to Hoffmann-La Roche Inc. Cephalosporins. 4,091,211, Cl. 544-21.000.

Moore, Raymond H.; and Cox, John L., to Battelle Memorial Institute. Process for catalytic depolymerization of coal to liquid fuel. 4,090,944, Cl. 208-10.000.

Moore, Wallace H. Solar celled hybrid vehicle. 4,090,577, Cl. 180-44.00M.

Moore, Wesley E., Jr.: *See—*
Shuler, Cobia B.; and Moore, Wesley E., Jr., 4,090,407, Cl. 73-290.00V.

Moran, David D., to United States of America, Navy. Axial fan with automatically controlled variable pitch blades. 4,090,812, Cl. 416-133.000.

Morel, Paul; and Dugois, Jean-Pierre, to Aluminum Pechiney. Method of and an apparatus for compensating the magnetic fields of adjacent rows of transversely arranged igneous electrolysis cells. 4,090,930, Cl. 204-67.000.

Morganson, Stephen A., to FMC Corporation. Carpet cleaning composition. 4,090,974, Cl. 252-135.000.

Mori Denki Manufacturing Co., Ltd.: *See—*
Mori, Shinjiro, 4,091,444, Cl. 362-374.000.

Mori, Shinjiro, to Mori Denki Manufacturing Co., Ltd. Glove-mounting apparatus for explosion-proof lighting devices. 4,091,444, Cl. 362-374.000.

Mori, Takao: *See—*
Chibata, Ichiro; Tosa, Tetsuya; Mori, Takao; Watanabe, Taizo; Sano, Ryujiro; and Matuo, Yuhsi, 4,090,919, Cl. 195-63.000.

Morihisa, Mitsuo, to Sharp Kabushiki Kaisha. Crystal oscillator implemented with CMOS technology. 4,091,338, Cl. 331-116.00R.

Morimoto, Osamu: *See—*
Ohsaka, Yohnosuke; and Morimoto, Osamu, 4,091,043, Cl. 260-653.700.

Morin, Robert B.: *See—*
Micetich, Ronald G.; Chin, Clinton G.; and Morin, Robert B., 4,091,026, Cl. 260-306.70C.

Morohoshi, Fumio, to Kabushiki Kaisha Daini Seikosha. Electronic metronome. 4,090,355, Cl. 58-130.00E.

Morris, Alton R., to Harbey Hubbell, Incorporated. Ground leakage relay circuit. 4,091,431, Cl. 361-45.000.

Morrison, John E., Jr.; and Abrams, Charlie F., Jr., to United States of America, Agriculture. Furrow opener and apparatus for no-tillage transplanters and planters. 4,090,456, Cl. 111-3.000.

Morsbach, Martin; Johren, Paul; and Weiss, Jurgen, to GOETZEWERKE Friedrich Goetze AG. Expander spring for piston rings. 4,090,720, Cl. 277-140.000.

Morse, Henry Clifton. Manually assemblable slide chart with integral self-locking tab. 4,090,313, Cl. 35-75.000.

Mortara, David W., to Marquette Electronics, Inc. Electrocardiographic recording method and means. 4,090,505, Cl. 128-2.06G.

Morzinek, Herbert: *See—*
Gollmick, Hans-Joachim; Klinkhart, Karl; Morzinek, Herbert; Bereiter, Wolfgang; and Rosenstock, Walter, 4,090,307, Cl. 34-9.000.

Moser, William R., to Exxon Research & Engineering Co. Hydrodesulfurization catalyst. 4,090,982, Cl. 252-465.000.

Motani, Kensuke; Sata, Toshikatsu; and Nishimura, Masakatsu, to Tokuyama Soda Kabushiki Kaisha. Anode-structure for electrolysis. 4,090,931, Cl. 204-98.000.

Motegi, Isoji: *See—*
Kakinuma, Mitsuo; Motegi, Isoji; Matsui, Yasuo; Matsui, Masatake; Ohtsuju, Masaaki; Takahashi, Kiyoshi; and Fukuda, Takeo, 4,091,064, Cl. 264-174.000.

Motorola Inc.: *See—*
Eichler, Jay Harris; and Gasparaitis, Bernard, 4,091,318, Cl. 320-2.000.
Hanna, John Edward, 4,091,321, Cl. 323-19.000.
Karas, Joseph Walter, 4,091,068, Cl. 264-274.000.
Lenk, Gerd Gerry; and Paul, Robert Allen, 4,091,232, Cl. 174-52.00R.

Lesk, Israel Arnold, 4,090,495, Cl. 126-270.000.
Mottine, John Joseph: *See—*
Congdon, Wayne Irving; Mottine, John Joseph; and Vesperman, William Charles, 4,090,763, Cl. 339-103.00M.
Moulin, Norbert L., to Hughes Aircraft Company. Contact assembly with rotational lock for wire wrap termination. 4,090,771, Cl. 339-217.00S.
Mount, Robert E.; and Gavrun, Michael T., to Curtiss-Wright Corporation. Multi-sectional driveshaft for a rotary piston mechanism. 4,090,822, Cl. 418-60.000.
Mount, Wadsworth W., to Bossert Manufacturing Corporation. Dual anchor apparatus and method of using same. 4,090,462, Cl. 114-293.000.
Mowbray, Kenneth D.; and Hagen, Kenneth L., to Electro Sprayer Systems, Inc. Powder metering system. 4,090,645, Cl. 222-193.000.
Moyer, Neal John: *See—*
Mizrahi, Albert; Moyer, Neal John; and Pezzutti, David August, 4,091,243, Cl. 179-84.0VF.
Mucha, George M.; Balzer, Norbert R.; and Day, Paul L., to Park-Ohio Industries, Inc. Method and apparatus of inductively heating elongated workpieces. 4,090,698, Cl. 266-133.000.
Mullaly, James Roy: *See—*
Wright, Robert Joseph; Mullaly, James Roy; and Hecht, Ralph Julius, 4,090,941, Cl. 204-298.000.
Muller, Gunther. Mounting device for fixedly fastening a pile to a sheet piling. 4,090,364, Cl. 61-39.000.
Muller, Hans, to Grapha-Holding AG. Apparatus for stacking and baling newspapers or the like. 4,090,441, Cl. 100-7.000.
Muller, Karl-Heinz; Schliepe, Reinhard; and Rindfleisch, Volker, to Siemens Aktiengesellschaft. Method for pictorially displaying output information generated by an object imaging apparatus. 4,091,374, Cl. 340-324.0AD.
Muller, Peter Robert, to Aiken Industries, Inc. California Instruments Division. Constant current-source with high voltage protection, compliance circuit. 4,091,432, Cl. 361-56.000.
Murase, Masao: *See—*
Umezawa, Hamao; Umezawa, Sumio; Fukatsu, Shunzo; Seki, Shigeo; Murase, Masao; and Yasuda, Shuntaro, 4,091,202, Cl. 536-10.000.
Murata, Seiichiro: *See—*
Nishimaki, Ko; Okamoto, Tomiyasu; Nishimoto, Tsunanori; Kataza, Taiji; Harada, Koji; Murata, Seiichiro; Higashimura, Masayoshi; and Ito, Takanori, 4,090,460, Cl. 114-74.00A.
Murdock, Alexander Hamilton: *See—*
Marshall, Larry A.; and Murdock, Alexander Hamilton, 4,090,674, Cl. 241-221.000.
Musch, Bernard E.; and Martin, Roy E., to Hewlett-Packard Company. Electronic calculator with optical input means. 4,091,270, Cl. 235-419.000.
Mushin, Aaron; and Saporta, Yaacov. Knitted fabric mulches. 4,090,325, Cl. 47-9.000.
Mutai, Masahiko; Mada, Mitsuo; Nakajima, Kei; Takahashi, Shusei; Nakao, Takashi; Shimada, Kiyohiro; and Iijima, Takashi, to Kabushiki Kaisha Yakult Honsha. Fermented milk product containing viable bifidobacteria. 4,091,117, Cl. 426-43.000.
Muto, Hiroaki: *See—*
Onda, Yoshiro; Muto, Hiroaki; and Suzuki, Hiroshi, 4,091,205, Cl. 536-85.000.
MW Industries, Inc.: *See—*
Wright, Gordon C., 4,090,436, Cl. 98-66.00R.
Myers, Daryl Lester, to Western Electric Company, Inc. Making insulated conductors. 4,090,896, Cl. 156-51.000.
Nagai, Yasuhiro: *See—*
Kano, Motomi; Hirakoso, Keiichiro; Nagai, Yasuhiro; and Horiuchi, Toshio, 4,091,258, Cl. 219-125.120.
Nagano, Mineo; Saitoh, Michio; Awazawa, Shigeru; and Tanaka, Koji, to Toyo Soda Manufacturing Co., Ltd. Process for preparing a polyvinylchloride composition by polymerization in the presence of molding additives. 4,090,994, Cl. 260-31.80R.
Nagashima, Takeo: *See—*
Ayusawa, Saburo; Nagashima, Takeo; and Tsutsumi, Masaya, 4,091,123, Cl. 427-44.000.
Nagel, Hartmut: *See—*
Klein, Hans-Peter; and Nagel, Hartmut, 4,090,892, Cl. 148-103.000.
Nakagawa, Tadashi: *See—*
Watanabe, Masanori; Onda, Eiichi; Koyama, Mitsuo; Nemoto, Ichiro; and Nakagawa, Tadashi, 4,091,401, Cl. 354-266.000.
Nakaguti, Osamu: *See—*
Kamiya, Takashi; Teraji, Tsutomu; Hashimoto, Masashi; Nakaguti, Osamu; and Oku, Teruo, 4,091,210, Cl. 544-18.000.
Nakai, Masanori: *See—*
Suzuki, Yasoji; Tokumaru, Yukuya; and Nakai, Masanori, 4,091,296, Cl. 307-292.000.
Nakajima, Kei: *See—*
Mutai, Masahiko; Mada, Mitsuo; Nakajima, Kei; Takahashi, Shusei; Nakao, Takashi; Shimada, Kiyohiro; and Iijima, Takashi, 4,091,117, Cl. 426-43.000.
Nakajima, Masaya; and Tabuchi, Katsumi, to Matsushita Electric Industrial Co., Ltd. Receiving system of telemetering signal. 4,091,357, Cl. 340-5.00R.
Nakajima, Yoshio: *See—*
Sawamura, Ichiro; Sogi, Shinroku; Kamachi, Shin-ichi; Yoshinaga, Makoto; Goto, Atsuo; Izawa, Masao; Nakajima, Yoshio; Gocho, Nagahiro; Shinohara, Toshio; and Hattori, Shin-ichiro, 4,090,921, Cl. 195-127.000.
Nakamura, Junpei, to Kabushiki Kaisha Daini Seikosha. Selective calling receiver. 4,091,373, Cl. 340-311.000.
Nakamura, Kazuaki, to Aisin Seiki Kabushiki Kaisha. High vacuum pump. 4,090,815, Cl. 417-203.000.
Nakamura, Kazuro: *See—*
Kojima, Shinichi; Nakamura, Kazuro; Koide, Ten; and Ogino, Shigeo, 4,091,093, Cl. 424-177.000.
Nakamura, Osamu, to Shinshu Seiki Kabushiki Kaisha. Paper feeding mechanism. 4,090,410, Cl. 74-414.000.
Nakanishi, Toyo. Apparatus for forming tucked-in type selvages on a shuttleless weaving loom. 4,090,535, Cl. 139-434.000.
Nakao, Fusafumi: *See—*
Yamamoto, Terumasa; Miyagawa, Katsuhiko; Kunishige, Hidenori; and Nakao, Fusafumi, 4,091,284, Cl. 250-337.000.
Nakao, Takashi: *See—*
Mutai, Masahiko; Mada, Mitsuo; Nakajima, Kei; Takahashi, Shusei; Nakao, Takashi; Shimada, Kiyohiro; and Iijima, Takashi, 4,091,117, Cl. 426-43.000.
Nakashima, Akira: *See—*
Kanazawa, Shogo; Nakashima, Akira; Yamato, Kazunari; Seriu, Naoyuki; Watanabe, Tohru; and Nakazawa, Susumu, 4,091,147, Cl. 428-683.000.
Nakayama, Shinpei: *See—*
Saito, Fumio; Yamai, Fumito; Beppu, Yositugu; and Nakayama, Shinpei, 4,091,054, Cl. 260-886.000.
Nakayama, Yukihiro: *See—*
Kobayashi, Akiyoshi; and Nakayama, Yukihiro, 4,090,331, Cl. 51-134.50R.
Nakazawa, Susumu: *See—*
Kanazawa, Shogo; Nakashima, Akira; Yamato, Kazunari; Seriu, Naoyuki; Watanabe, Tohru; and Nakazawa, Susumu, 4,091,147, Cl. 428-683.000.
Nakos, Steven T.: *See—*
Babiec, John S., Jr.; Nakos, Steven T.; and Goldstein, Stephen L., 4,090,988, Cl. 260-2.5AC.
Nannen, William G. Tapping device. 4,090,808, Cl. 408-222.000.
Naono, Toyohiko, to Nihon Denshi Kabushiki Kaisha. Automatic analyzing apparatus. 4,090,848, Cl. 23-253.00R.
Napier, Bradley, Jr.: *See—*
Smith, Wesley E.; and Napier, Bradley, Jr., 4,091,196, Cl. 526-73.000.
Nash, Charles D.: *See—*
Jones, Thaddeus M.; Shah, Hasmukh R.; and Nash, Charles D., 4,091,271, Cl. 235-419.000.
Nathan, Yehuda. Portable temperature and pulse monitor. 4,090,504, Cl. 128-2.05R.
National Mine Service Company: *See—*
Freed, Donald L., Jr., 4,090,601, Cl. 198-316.000.
National Semiconductor Corporation: *See—*
Pantiga, Gene N.; and Allen, Robert M., 4,090,928, Cl. 204-15.000.
Naumann, Gerhard: *See—*
Schornig, Eberhard; and Naumann, Gerhard, 4,091,404, Cl. 354-321.000.
Naylor, Tom D.; and Matinlassi, Ulf A., to Sandvik Special Metals Corporation. Method of producing zircaloy tubes. 4,090,386, Cl. 72-208.000.
NCR Corporation: *See—*
Biedermann, Horst H., 4,090,600, Cl. 400-213.000.
McPherson, Bruce M., 4,090,613, Cl. 211-69.500.
Nedelec, Lucien; Pierdet, Andre; Dumont, Claude; and Kannengiesser, Marie-Helene, to Roussel Uclaf. 7-Amino-benzocycloheptenes. 4,091,115, Cl. 424-330.000.
Nelson, Arthur L., to Townsend & Townsend, trustee. Cable molding method. 4,091,062, Cl. 264-85.000.
Nelson, Charles J.: *See—*
Nelson, Evan S.; and Nelson, Charles J., 4,090,635, Cl. 220-258.000.
Nelson Company, The: *See—*
Nelson, Evan S.; and Nelson, Charles J., 4,090,635, Cl. 220-258.000.
Nelson, Evan S.; and Nelson, Charles J., to Nelson Company, The. Easily perforatable container to facilitate dispensing of contents. 4,090,635, Cl. 220-258.000.
Nemoto, Ichiro: *See—*
Watanabe, Masanori; Onda, Eiichi; Koyama, Mitsuo; Nemoto, Ichiro; and Nakagawa, Tadashi, 4,091,401, Cl. 354-266.000.
Nenov, Dragan Iliev: *See—*
Balevski, Angel Tonchev; Nikolov, Ivan Dimov; and Nenov, Dragan Iliev, 4,090,837, Cl. 425-588.000.
Nguyen, Phi Duy, to Societe de Traction Cem - Oerlikon. Method and apparatus to recharge a battery aboard an electric vehicle. 4,091,319, Cl. 320-9.000.
Nicolas, Edgard; and Bourgeois, Louis, to Solvay & Cie. Electrolytic diaphragm cell. 4,090,939, Cl. 204-258.000.
Nieber, Allen J., to Efficiency Production, Inc. Portal frame for trench box stack. 4,090,365, Cl. 61-41.00A.
Niederjohn, Wayne M.; and Underwood, John R., to General Electric Company. High voltage winding lead and terminal structure. 4,091,349, Cl. 336-192.000.
Nielsen, Arnold T., to United States of America, Navy. Procedure for making trimethylolmethane. 4,091,040, Cl. 568-853.000.
Nieson, Norman, to Teleglobe Pay-TV System, Inc. Decoder mode validation apparatus for pay television systems. 4,091,417, Cl. 358-117.000.
Niggl, Hans. Accumulator having deformation resisting conducting core. 4,091,183, Cl. 429-138.000.

Nihon Beru-Haueru Kabushiki Kaisha (Bell & Howell Japan, Ltd.): *See—*
Mizuki, Yoshiaki, 4,090,783, Cl. 352-27.000.
Nihon Denshi Kabushiki Kaisha: *See—*
Naono, Toyohiko, 4,090,848, Cl. 23-253.00R.
Nijenhuis, Emil Johan, to De Staat Der Nederlanden, Te Dezen Vertegenwoordigd Door De Directeur-Generaal Der Posterijen, Telegrafie En Telefonie. Printer and control circuit therefor. 4,091,235, Cl. 178-23.00R.
Niki, Masao: *See—*
Fukusaki, Hiroshi; Niki, Masao; and Yokota, Yukinaga, 4,090,991, Cl. 260-23.0EM.
Nikolov, Ivan Dimov: *See—*
Balevski, Angel Tonchev; Nikolov, Ivan Dimov; and Nenov, Dragan Iliev, 4,090,837, Cl. 425-588.000.
Nimeck, Maxwell W.: *See—*
Parker, William L.; Meyers, Edward; Nimeck, Maxwell W.; and Brown, William E., 4,091,092, Cl. 424-118.000.
Nintendo Co., Ltd.: *See—*
Izushi, Takehiro, 4,090,714, Cl. 273-101.100.
Nippon Electric Company, Ltd.: *See—*
Yano, Takeshi; Kanazawa, Seiichiro; Futami, Takehiro; and Ishiyama, Yasuyuki, 4,091,345, Cl. 333-71.000.
Nippon Gakki Seizo Kabushiki Kaisha: *See—*
Takamura, Masayuki; Matsuo, Aritsune; and Iijima, Kenzaburo, 4,090,873, Cl. 75-208.00R.
Nippon Kayaku Kabushiki Kaisha: *See—*
Aoki, Yukio; Wakita, Shizuo; Kato, Shoichi; Tejima, Iwao; and Ishida, Shuichi, 4,091,109, Cl. 424-304.000.
Nippon Kogaku K.K.: *See—*
Iida, Yozo; Kawahara, Yasuhito; and Igarashi, Shigemi, 4,091,398, Cl. 354-145.000.
Ohmori, Sachio, 4,091,399, Cl. 354-152.000.
Nippon Oil Company Limited: *See—*
Horii, Hideo; Otsuki, Yutaka; Kaiya, Atsushi; and Araki, Yoshihiko, 4,091,052, Cl. 260-879.000.
Mitamura, Kazuyoshi; and Itoh, Hiroyuki, 4,090,891, Cl. 148-28.000.
Nippon Steel Corporation: *See—*
Ayusawa, Saburo; Nagashima, Takeo; and Tsutsumi, Masaya, 4,091,123, Cl. 427-44.000.
Kanazawa, Shogo; Nakashima, Akira; Yamato, Kazunari; Seriu, Naoyuki; Watanabe, Tohru; and Nakazawa, Susumu, 4,091,147, Cl. 428-683.000.
Nippon Telegraph and Telephone Public Corporation: *See—*
Ishida, Akira, 4,091,405, Cl. 357-23.000.
Nishikawa, Kazuyoshi: *See—*
Sugimoto, Hiroshi; and Nishikawa, Kazuyoshi, 4,090,748, Cl. 308-121.000.
Nishimaki, Ko; Okamoto, Tomiyasu; Nishimoto, Tsunanori; Kataza, Taiji; Harada, Koji; Murata, Seiichiro; Higashimura, Masayoshi; and Ito, Takanori, to Hitachi Shipbuilding & Eng. Co., Ltd. Spherical tank supporting system for low temperature liquified gas storage tank carrying vessel. 4,090,460, Cl. 114-74.00A.
Nishimoto, Tsunanori: *See—*
Nishimaki, Ko; Okamoto, Tomiyasu; Nishimoto, Tsunanori; Kataza, Taiji; Harada, Koji; Murata, Seiichiro; Higashimura, Masayoshi; and Ito, Takanori, 4,090,460, Cl. 114-74.00A.
Nishimura, Hiromi; Ono, Kenji; and Shibata, Minoru, to Matsushita Electric Works, Ltd.; and Sauer, Hans. Reed relay. 4,091,346, Cl. 335-78.000.
Nishimura, Masakatsu: *See—*
Motani, Kensuke; Sata, Toshikatsu; and Nishimura, Masakatsu, 4,090,931, Cl. 204-98.000.
Nishioka, Toshio: *See—*
Ohno, Nobuo; Ohno, Isao; Nishioka, Toshio; Takeda, Hisami; and Kasamatsu, Kiyoshi, 4,091,111, Cl. 424-308.000.
Nishiyama, Tatsuichiro: *See—*
Takagi, Toshinori; Nishiyama, Tatsuichiro; and Uchida, Unosuke, 4,091,138, Cl. 428-209.000.
Nissan Motor Company, Ltd.: *See—*
Inami, Sumio; Koike, Kiyoshi; Hayashida, Masayoshi; and Yamaoka, Shigeyuki, 4,090,734, Cl. 296-146.000.
Kawamoto, Tamio; Takahashi, Asao; and Toyota, Hiroshi, 4,091,348, Cl. 251-129.000.
Takahashi, Koichi; Hitomi, Nobuteru; Kizu, Taisuke; Honchi, Hirotugu; and Arita, Kazuo, 4,090,375, Cl. 64-21.000.
Nitschneider, Robert M.; Sargis, John R.; and Abrams, Martin, to AES Technology Systems, Inc. Staple removing method. 4,090,690, Cl. 254-28.000.
Nitto Electric Industrial Co., Ltd.: *See—*
Hori, Yutaka; Takahashi, Hidekazu; Sunakawa, Makoto; Ijichi, Ichiro; and Kamei, Kiyohiro, 4,091,157, Cl. 428-196.000.
Noda, Kazukuni: *See—*
Hayashi, Shigeki; Noda, Kazukuni; and Kusaka, Shigeru, 4,091,315, Cl. 318-603.000.
Noland, Wayne B. Electrically heated animal watering device. 4,091,261, Cl. 219-301.000.
Nomura, Yasushi, to Citizen Watch Co., Limited. Electronic timepiece. 4,090,350, Cl. 58-23.00R.
Norlin Music, Inc.: *See—*
Luce, David A., 4,090,426, Cl. 84-1.260.
Northern Telecom Limited: *See—*
Chu, Pak-Jong; and Audette, Jacques Marcel, 4,091,244, Cl. 179-158.00R.
Northrop Corporation: *See—*
Crandall, Walter Ellis, 4,091,332, Cl. 330-43.000.
Hant, William, 4,091,306, Cl. 313-409.000.
Norton, Bernard W., to B.W. Norton Manufacturing Co. Inc. Metal paint pail cover. 4,090,636, Cl. 220-307.000.
Norton, Richard V., to Suntech, Inc. Process for the preparation of cyanohydrin esters. 4,091,010, Cl. 260-465.00D.
Nottes, Guenther; Bronstert, Klaus; and Klaerner, Peter, to BASF Aktiengesellschaft. Method of stabilizing mineral oil and its refinery products. 4,090,946, Cl. 208-48.0AA.
Noyon, Gustave Maurice, to Societe Internationale d'Investissements et de Participations par abreviation Interpar. System for handling a container. 4,090,623, Cl. 214-38.00D.
Noyori, Kazumasa: *See—*
Sugimoto, Takashi; and Noyori, Kazumasa, 4,091,339, Cl. 331-117.00R.
Nozik, Arthur J., to Allied Chemical Corporation. Photoelectrolysis of water by solar radiation. 4,090,933, Cl. 204-129.000.
Nusco Kabushiki Kaisha: *See—*
Hayashi, Shigeki; Noda, Kazukuni; and Kusaka, Shigeru, 4,091,315, Cl. 318-603.000.
Nygaard-Welch-Rushing Partnership: *See—*
Welch, Albert B., 4,090,572, Cl. 175-16.000.
Nygards, Olof Martin, to Aktiebolaget Bofors. Safety device. 4,090,450, Cl. 102-76.00P.
O. M. Scott & Sons Company: *See—*
Simmons, James Almy; Wood, George Edson; and Jacquemin, Paul Leroy, 4,090,866, Cl. 71-108.000.
O'Brien, John C.; and Ehrenfreund, Herbert A., to Shaw Plastics Corporation. Synthetic cork-like material and method of making same. 4,091,136, Cl. 428-141.000.
O'Brien, John W. Method and device for detecting hydraulic leaks. 4,090,396, Cl. 73-46.000.
O'Connor, Michael Niall Desmond: *See—*
Panzer, Hans Peter; O'Connor, Michael Niall Desmond; and Baccei, Louis J., 4,091,224, Cl. 548-353.000.
Oda, Shizuo: *See—*
Sato, Shoichi; and Oda, Shizuo, 4,090,656, Cl. 228-180.00R.
Ogawa, Iwakichi, to Takara Co., Ltd. Animated reconfigurable command station toy. 4,090,321, Cl. 46-12.000.
Ogawa, Shinsaku: *See—*
Kazihara, Akira; Ogawa, Shinsaku; Kobayashi, Takekuni; and Seko, Maomi, 4,090,932, Cl. 204-98.000.
Ogilvie, John Taylor: *See—*
Thompson, David Gale; and Ogilvie, John Taylor, 4,090,288, Cl. 29-570.000.
Ogino, Shigeo: *See—*
Kojima, Shinichi; Nakamura, Kazuro; Koide, Ten; and Ogino, Shigeo, 4,091,093, Cl. 424-177.000.
Ogle, Gilbert J.: *See—*
Ogren, John R.; Ogle, Gilbert J.; and Rutkowski, Eugene V., 4,090,979, Cl. 252-441.000.
Ogren, John R.; Ogle, Gilbert J.; and Rutkowski, Eugene V., to United States of America, Army. Process for producing chemical pump absorbents for a cartridge combustion-driven chemical laser. 4,090,979, Cl. 252-441.000.
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Endo, Katutoshi; and Ohira, Makoto, 4,091,145, Cl. 428-546.000.
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Ohleyer, Bernd, to Siemens Aktiengesellschaft. Apparatus for turning a turbine shaft. 4,090,409, Cl. 74-128.000.
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Ohta, Takeo; Takenaga, Mutsuo; Akahira, Nobuo; Yamada, Noboru; and Yamashita, Tadaoki, to Matsushita Electric Industrial Co., Ltd. Optical information storage material and method of making it. 4,091,171, Cl. 428-539.000.
Ohta, Terukazu: *See—*
Yano, Matsunosuke; Yajima, Toshio; and Ohta, Terukazu, 4,090,676, Cl. 242-18.0DD.
Ohta, Yoshiharu: *See—*
Sahara, Masayoshi; Matsuda, Motonobu; and Ohta, Yoshiharu, 4,091,396, Cl. 354-23.00D.
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Itoh, Yukinori; Shibata, Mituhiko; Masuda, Akira; Ohtake, Yasuo; and Etoh, Motoaki, 4,090,484, Cl. 123-127.000.
Ohtsuju, Masaaki: *See—*
Kakinuma, Mitsuo; Motegi, Isoji; Matsui, Yasuo; Matsui, Masatake; Ohtsuju, Masaaki; Takahashi, Kiyoshi; and Fukuda, Takeo, 4,091,064, Cl. 264-174.000.

Ohtsuki, Hideharu: *See—*
Okada, Toshio; Ohtsuki, Hideharu; Inagaki, Hiroshi; Hanyuda, Toshiaki; Tokuno, Masateru; and Igarashi, Seiichi, 4,091,167, Cl. 428-413.000.

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Okazaki, Mitsuo; Yamaguchi, Akihiro; and Sasaki, Masaomi, to Ricoh Co., Ltd. α-(9-Anthryl)-β-(3-carbazolyl)ethylene derivatives. 4,091,208, Cl. 542-454.000.

Okinaka, Yutaka: *See—*
Chesseri, Roy Joseph; and Okinaka, Yutaka, 4,090,934, Cl. 204-140.000.

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Kamiya, Takashi; Teraji, Tsutomu; Hashimoto, Masashi; Nakaguti, Osamu; and Oku, Teruo, 4,091,210, Cl. 544-18.000.

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Olding, Michael J.; Fortman, Ronald F.; and Stewart, William J., to Minster Machine Company, The. Press control system. 4,091,438, Cl. 361-189.000.

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Babiec, John S., Jr.; Nakos, Steven T.; and Goldstein, Stephen L., 4,090,988, Cl. 260-2.5AC.
Cassata, John R., 4,091,009, Cl. 260-453.0PH.
Godfrey, John N., 4,091,170, Cl. 428-510.000.

Olivieri, Icaro, to Olivieri, Icaro; and C. Minuterie Metalliche S.p.A. Lacing device for ski boots. 4,090,278, Cl. 24-70.0SK.

Olympus Optical Co., Ltd.: *See—*
Sawamura, Ichiro; Sogi, Shinroku; Kamachi, Shin-ichi; Yoshinaga, Makoto; Goto, Atsuo; Izawa, Masao; Nakajima, Yoshio; Gocho, Nagahiro; Shinohara, Toshio; and Hattori, Shin-ichiro, 4,090,921, Cl. 195-127.000.

Omori, Yasuo; and Kataoka, Hiroshi, to Victor Company of Japan, Limited. Video amplifier. 4,091,420, Cl. 358-184.000.

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Watanabe, Masanori; Onda, Eiichi; Koyama, Mitsuo; Nemoto, Ichiro; and Nakagawa, Tadashi, 4,091,401, Cl. 354-266.000.

Onda, Yoshiro; Muto, Hiroaki; and Suzuki, Hiroshi, to Shin-Etsu Chemical Co., Ltd. Method for preparing low-substituted cellulose ethers. 4,091,205, Cl. 536-85.000.

Ondetti, Miguel Angel, to E. R. Squibb & Sons, Inc. Pyrrolidine and piperidine-2-carboxylic acid derivatives. 4,091,024, Cl. 260-293.630.

Ono, Kenji: *See—*
Nishimura, Hiromi; Ono, Kenji; and Shibata, Minoru, 4,091,346, Cl. 335-78.000.

Orban nee Kelemen, Maria: *See—*
Boros, Jozsef; Ferenczi, Tibor; Horvath, Gyula; Lazar, Ferenc; Lengyel, Laszlo; Matyasi, Jozsef; Orban nee Kelemen, Maria; Pinter, Tihamer; Sigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Bela; Voros, Istvan; Wentzely, Kalman; Zambo, Janos; and Zoldi, Jozsef, 4,091,071, Cl. 423-121.000.

Ormili, Bernard; and Comte, Georges, to Les Cables de Lyon S.A. Manufacture of helical wave guides. 4,090,280, Cl. 29-33.00K.

Orscheln Brake Lever Mfg. Co.: *See—*
Bopp, Robert D.; and Klosterman, David P., 4,090,731, Cl. 296-28.00C.

Ostman, Karl Bertil Lennart: *See—*
Bosund, Sven Ingmar Walton; Bengtsson, Bengt Lennart; and Ostman, Karl Bertil Lennart, 4,091,003, Cl. 260-112.00R.

Otsuka, Hiroshi: *See—*
Igarashi, Isaburo; Iizuka, Kazuriki; and Otsuka, Hiroshi, 4,091,462, Cl. 366-17.000.

Otsuki, Yutaka: *See—*
Horii, Hideo; Otsuki, Yutaka; Kaiya, Atsushi; and Araki, Yoshihiko, 4,091,052, Cl. 260-879.000.

Ott, John J.; Ward, Thomas F.; and Cyr, Richard D., to ESB Incorporated. Dry cell battery having electrical spring contact adhered to terminal. 4,091,186, Cl. 429-157.000.

Ott, John Nash, to John Ott Laboratories, Inc. Full-spectrum luminaire. 4,091,441, Cl. 362-1.000.

Otto Bilz Werkzeugfabrik: *See—*
Bilz, Reiner, 4,090,802, Cl. 408-6.000.

Outboard Marine Corporation: *See—*
Prince, Anthony P., 4,090,598, Cl. 192-.096.

Outdoor Sports Inc.: *See—*
Davis, Larry D., 4,090,780, Cl. 350-255.000.

Outten, Edward, to Thiokol Corporation. High energy fuel slurry. 4,090,895, Cl. 149-22.000.

Owen, Hartley; and Venuto, Paul B., to Mobil Oil Corportion. Upgrading of olefinic gasoline with hydrogen contributors. 4,090,949, Cl. 208-78.000.

Owens-Corning Fiberglas Corporation: *See—*
Lin, Kingso C.; and Hammond, Donald J., 4,090,984, Cl. 252-511.000.

Owens-Illinois, Inc.: *See—*
Amberg, Stephen W.; and Amberg, Ralph G., 4,090,905, Cl. 156-218.000.
Herman, James N.; and Kaczorowski, David M., 4,090,394, Cl. 73-37.000.

Oxendine, Ozmer Lee. Pad for vehicle having flat bed. 4,091,149, Cl. 428-33.000.

P.R. Mallory & Co. Inc.: *See—*
Dey, Arabinda N., 4,091,188, Cl. 429-174.000.
Kaye, Gordon E., 4,091,187, Cl. 429-159.000.
Rao, M. L. Bhaskara; and Schlaikjer, Carl R., 4,091,152, Cl. 429-105.000.

Paasche Airbrush Co.: *See—*
Kurowski, Benedict; and Sack, George, 4,090,334, Cl. 51-427.000.

Pachot, James Joseph: *See—*
Rabinowitz, Mario; and Pachot, James Joseph, 4,091,230, Cl. 174-15.00C.

Pacini, Edo, to FIMEC S.p.A. Apparatus for receiving fabric produced by a circular knitting machine. 4,090,376, Cl. 66-153.000.

Packard, Thomas D., to Bird Machine Company, Inc. Material treating apparatus. 4,090,385, Cl. 72-191.000.

Pallos, Laszlo: *See—*
Benko, Pal; Simonek, Ildiko; Pallos, Laszlo; Kovacs, Jeno; and Magyar, Karoly, 4,091,206, Cl. 542-416.000.

Pancheri, Eugene J.: *See—*
Maguire, Edward John, Jr.; and Pancheri, Eugene J., 4,090,973, Cl. 252-89.00R.

Pantiga, Gene N.; and Allen, Robert M., to National Semiconductor Corporation. Method for selectively plating lead frames. 4,090,928, Cl. 204-15.000.

Pantridge, James Francis; and Anderson, John. Defibrillators. 4,090,519, Cl. 128-419.00D.

Panzer, Hans Peter; O'Connor, Michael Niall Desmond; and Baccei, Louis J., to American Cyanamid Company. Alkoxy imidazolines. 4,091,224, Cl. 548-353.000.

Papafingos, Pandelis N.; and Lance, Richard T., to Alumax Mill Products, Inc. Salt cake evaporator apparatus. 4,090,916, Cl. 159-9.00A.

Papayoanou, Aristotle, to United States of America, Army. Porous ceramic tubing for flowing gas lasers. 4,091,133, Cl. 428-36.000.

Paper Converting Machine Company: *See—*
Schaeuble, Edwin K., 4,091,129, Cl. 427-345.000.

Pappa, Rosario: *See—*
Zappelli, Piergiorgio; Rossodivita, Antonio; Pappa, Rosario; and Re, Luciano, 4,091,203, Cl. 536-26.000.

Pappas, Spiro J., to Westinghouse Air Brake Company. Grade crossing assembly. 4,090,685, Cl. 246-125.000.

Paraho Corporation: *See—*
Reeves, Adam A., 4,090,945, Cl. 208-11.00R.

Pare, Donald R.: *See—*
Krisko, Michael L.; and Pare, Donald R., 4,090,434, Cl. 98-38.00E.

Parent, Jean-Claude. Apparatus for the superimposed storage of vehicles. 4,090,621, Cl. 214-16.1ED.

Park-Ohio Industries, Inc.: *See—*
Mucha, George M.; Balzer, Norbert R.; and Day, Paul L., 4,090,698, Cl. 266-133.000.

Parker, Dane K., to Goodyear Tire & Rubber Company, The. Antioxidant ester substituted phenols and process for their preparation. 4,091,225, Cl. 560-20.000.

Parker, William L.; Meyers, Edward; Nimeck, Maxwell W.; and Brown, William E., to E. R. Squibb & Sons, Inc. Polymyxin F and process of producing polymyxin F. 4,091,092, Cl. 424-118.000.

Parlak, Rosemary Anne: *See—*
Massucci, Josephine Vicari; and Parlak, Rosemary Anne, 4,090,300, Cl. 33-1.00R.

Parr, David Turner, to BICC Limited. Jointing or terminating plastics sheathed electric cable. 4,090,294, Cl. 29-628.000.

Parshin, Anatoly Alexeevich: *See—*
Golovanov, Nikolai Vasilievich; Ivanov, Vitaly Alexandrovich; Mitor, Vyacheslav Vladimirovich; Parshin, Anatoly Alexeevich; Sapozhnikov, Fedor Vasilievich; Ter-Minosian, Sergei Mikhailovich; and Chavchanidze, Evgeny Kirillovich, 4,090,473, Cl. 122-6.00A.

Parsons, Roger R., to Raven Industries, Inc. Pressure and hot air relief vents for a pressurized hot air airship. 4,090,682, Cl. 244-99.000.

Patel, Purshottam S.; and McDowell, Donald J., to Felt Products Mfg. Co. High-strength anaerobic sealant composition and method of preparation. 4,090,997, Cl. 260-47.0UA.

Patterson, John A.: *See—*
Johnson, Fred L., Jr.; and Patterson, John A., 4,091,014, Cl. 260-512.00R.

Paul, Robert Allen: *See—*
Lenk, Gerd Gerry; and Paul, Robert Allen, 4,091,232, Cl. 174-52.00R.

Paule, Kurt: *See—*
Wanner, Karl; Paule, Kurt; Adam, Hermann; and Reibetanz, Wilbert, 4,090,297, Cl. 30-124.000.

Pauley, Reginald William: *See—*
Barrows, Robert Earl; and Pauley, Reginald William, 4,090,821, Cl. 418-41.000.

Pears, Roy A., to Raymond Lee Organization, Inc., The. Ladder stabilizer. 4,090,586, Cl. 182-204.000.

Pearse, Michael Gordon: *See—*
Davies, Robert William; Pratt, Frederick; and Pearse, Michael Gordon, 4,090,912, Cl. 156-502.000.

Pease, William J.: *See—*
Phillips, Raymond M.; and Pease, William J., 4,090,908, Cl. 156-380.000.

Peche, Gerhard: *See—*
Lange, Gerhard; and Peche, Gerhard, 4,091,436, Cl. 361-120.000.

Pechiney Ugine Kuhlmann: *See—*
Jannier, Michel; Berlo, Florent; and Bridier, Jean, 4,090,929, Cl. 204-28.000.
Peck, Richard O., to Coors Container Company. Gun for tribo charging powder. 4,090,666, Cl. 239-15.000.
Peetz, Heinz: *See—*
Richter, Heinz; and Peetz, Heinz, 4,091,272, Cl. 250-199.000.
Pentney, Harry, to Gillette Company, The. Shaving unit dispenser. 4,090,638, Cl. 221-307.000.
Perfetti, Guido A., to Bethlehem Steel Corporation. Nonperishable direct enameling steel and method for producing same. 4,091,131, Cl. 427-386.000.
Perin, Philippe, to Ste Fiat France S.A. Devices for automatically coupling implements to self-propelled vehicles. 4,090,725, Cl. 280-479.00A.
Perrey, Klaus: *See—*
Soder, Alfons; and Perrey, Klaus, 4,091,095, Cl. 424-211.000.
Perrine, Ralph J., to Electric Furnace Company, The. Apparatus and method for treating wire. 4,090,697, Cl. 266-111.000.
Pertsikov, Zelik Ilich: *See—*
Babasov, Mikhail Vladimirovich; Zazimko, Viktor Afanasievich; Reidemeister, Iraida Ivanovna; Semenenko, Jury Lukich; Pertsikov, Zelik Ilich; Levin, Mikhail Samuilovich; Eremeev, Valery Konstantinovich; and Varava, Leonid Mikhailovich, 4,090,381, Cl. 72-68.000.
Pessel, Leopold, to American Electronic Laboratories, Inc. Method for removing sulfur dioxide from flue gases. 4,091,075, Cl. 423-242.000.
Peters, Mathias A. C.: *See—*
van Denderen, Adrianus J.; van de Kerkhof, Marianus A. G.; Peters, Mathias A. C.; and van der Waal, Jan, 4,090,389, Cl. 72-350.000.
Petlevich, Walter J.; and Sverdrup, Edward F., to United States of America, Energy. Doppler radar flowmeter. 4,091,385, Cl. 343-8.000.
Petro-Data C.A.: *See—*
Rankin, E. Edward, 4,090,573, Cl. 175-45.000.
Petrocci, Alfonso N.: *See—*
Green, Harold A.; Merianos, John J.; and Petrocci, Alfonso N., 4,091,113, Cl. 424-329.000.
Petrov, Arnold Ivanovich: *See—*
Folomin, Anatoly Alexandrovich; Fesenko, Vsevolod Karpovich; Evgrafov, Konstantin Georgievich; Yakovlev, Lev Mikhailovich; and Petrov, Arnold Ivanovich, 4,090,597, Cl. 192-85.0AA.
Petzold, Manfred; Grunert, Heinz; Rupilius, Wolfgang; and Rutzen, Horst, to Henkel Kommanditgesellschaft auf Aktien. Process for the dyeing of polyacrylonitrile fibrous material. 4,090,845, Cl. 8-169.000.
Peyer, Siegfried: *See—*
Schwartz, Hermann, 4,091,368, Cl. 340-259.000.
Pezzutti, David August: *See—*
Mizrahi, Albert; Moyer, Neal John; and Pezzutti, David August, 4,091,243, Cl. 179-84.0VF.
Pfeifer, John E.: *See—*
Mason, Stanley I., Jr.; and Pfeifer, John E., 4,091,371, Cl. 340-274.00R.
Pfizer Inc.: *See—*
Bindra, Jasjit Singh, 4,091,207, Cl. 542-429.000.
Pflugmacher, Ingo: *See—*
Rademachers, Jakob; Hund, Franz; Pflugmacher, Ingo; and Winter, Gerhard, 4,090,888, Cl. 106-304.000.
Pheripheral Sciences, Inc.: *See—*
McKinney, Gordon W., 4,090,611, Cl. 209-111.800.
Phillips, Michael James; and Archer, John David, to ITT Industries, Inc. Terminating optical fibers and optical fiber connector. 4,090,778, Cl. 350-96.200.
Phillips Petroleum Company: *See—*
Becker, Ralph S.; Fenstermaker, Roger W.; and Guillory, Jack P., 4,090,847, Cl. 23-230.00R.
Dixon, Rolland E., 4,091,046, Cl. 260-680.00R.
Haskell, Donald M.; and Carter, Cecil O., 4,090,923, Cl. 203-51.000.
Kitchen, Alonzo G., 4,091,053, Cl. 260-880.00B.
Moczygemba, George A., 4,091,051, Cl. 260-880B.
Smith, Richard L.; Farrar, Ralph C.; and Willis, Daniel H., 4,091,198, Cl. 526-178.000.
Phillips, Raymond M.; and Pease, William J. Apparatus for making water bed mattresses. 4,090,908, Cl. 156-380.000.
Pierdet, Andre: *See—*
Nedelec, Lucien; Pierdet, Andre; Dumont, Claude; and Kannengiesser, Marie-Helene, 4,091,115, Cl. 424-330.000.
Pietraszek, Thaddeus A.: *See—*
Martin, Frank S.; and Pietraszek, Thaddeus A., 4,090,716, Cl. 273-232.000.
Pilgram, Kurt H. G., to Shell Oil Company. Herbicidal 1,3-oxathiolan-5-ones. 4,090,861, Cl. 71-90.000.
Pilgrim, William S., to Welch Allyn, Inc. Diagnostic instrument. 4,090,506, Cl. 128-11.000.
Pim, Norman Lester, to Gulf & Western Manufacturing Company. Roll changing apparatus. 4,090,388, Cl. 72-239.000.
Pinter, Tihamer: *See—*
Boros, Jozsef; Ferenczi, Tibor; Horvath, Gyula; Lazar, Ferenc; Lengyel, Laszlo; Matyasi, Jozsef; Orban nee Kelemen, Maria; Pinter, Tihamer; Sigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Bela; Voros, Istvan; Wentzely, Kalman; Zambo, Janos; and Zoldi, Jozsef, 4,091,071, Cl. 423-121.000.
Piontkowski, Carl F.; and Yarocki, George L. Chimney cleaner. 4,090,271, Cl. 15-243.000.
Pittway Corporation: *See—*
Siegel, Steve L.; and Schwarzbach, Richard J., 4,091,363, Cl. 340-227.00R.
Plass, Ludolf: *See—*
Reh, Lothar; Plass, Ludolf; and Marchessaux, Philippe, 4,091,085, Cl. 423-625.000.
Plastic Products, Inc.: *See—*
Jacobs, Lawrence O'Quinn, 4,090,692, Cl. 254-141.000.
Platt, Stephen A., to S. A. Platt, Inc. Wire coiling machine fluid cutoff. 4,090,425, Cl. 83-402.000.
Plewes, John Travis, to Bell Telephone Laboratories, Incorporated. Method for making copper-nickel-tin strip material. 4,090,890, Cl. 148-12.70C.
Pogorel, John, Jr.: *See—*
George, Robert A.; and Pogorel, John, Jr., 4,090,889, Cl. 148-11.50A.
Polaroid Corporation: *See—*
Gulbrandsen, Richard E., 4,091,397, Cl. 354-81.000.
Land, Edwin H., 4,091,400, Cl. 354-202.000.
McElwaine, David C., 4,090,784, Cl. 352-74.000.
Poley, Neil Myron; and Skolnik, Marvin Benjamin, to International Business Machines Corporation. Gas panel spacer technology. 4,091,305, Cl. 313-220.000.
Poling, George W.; and Rosas, Jorge E., to Canadian Patents & Development Limited. Flotation of non-sulphide copper ores. 4,090,867, Cl. 75-2.000.
Polinsky, Murray Arthur: *See—*
Williams, Robert Powell; and Polinsky, Murray Arthur, 4,091,407, Cl. 357-54.000.
Pollinger, Hans; and Prahl, Franz, to Knorr-Bremse GmbH. Brake shoe for disc brakes. 4,090,591, Cl. 188-73.100.
Pollock, Douglas; Sobarzo, Omar; Urquizar, Rolando; Vilches, Carlos; and Bolanos, Jaime, to Compania de Acero del Pacifico S.A. Continuous smelting and refining of cement copper. 4,090,870, Cl. 75-74.000.
Pollow, Sheldon D.: *See—*
Zindler, Hugh A.; and Pollow, Sheldon D., 4,090,595, Cl. 192-17.00R.
Polychrome Corporation: *See—*
Chu, Simon Long; Golda, Eugene; and Wilkes, Alan Leonard, 4,090,880, Cl. 96-86.00R.
Polymer Research Corp. of America: *See—*
Horowitz, Carl; and Dichter, Michael, 4,091,193, Cl. 429-219.000.
Porta, Augusto: *See—*
Fresnel, Jean-Marie; Kulhanek, Antonin; and Porta, Augusto, 4,090,927, Cl. 204-10.000.
Porta Systems Corp.: *See—*
Ahuja, Omprakash, 4,091,435, Cl. 361-119.000.
Porter, Marion G.: *See—*
Woods, John M.; Porter, Marion G.; and Monahan, Earnest M., 4,091,455, Cl. 364-200.000.
Porter, Raymond P., to Acushnet Company. Windshield wiper. 4,090,272, Cl. 15-250.360.
Post Office, The: *See—*
Greaves, Alan John; Greenaway, Phillip Ernest; and Rollett, John Mortimer, 4,091,340, Cl. 331-132.000.
Greaves, Alan John; Greenaway, Phillip Ernest; and Rollett, John Mortimer, 4,091,341, Cl. 331-132.000.
Potter, Edwin F., Jr.: *See—*
Fuller, William Brewster; Potter, Edwin F., Jr.; and Marcus, Melvin Arnold, 4,091,273, Cl. 250-199.000.
Potter, Gordon C., to Exxon Research & Engineering Co. Vapor recovery system. 4,090,525, Cl. 137-171.000.
Powell, Jerome L., to Exxon Production Research Company. Method for cementing well pipe. 4,090,561, Cl. 166-292.000.
PPG Industries, Inc.: *See—*
Edge, Charles K.; and Kunkle, Gerald E., 4,091,156, Cl. 428-192.000.
Franz, Helmut; and Vanek, James C., 4,091,128, Cl. 427-304.000.
McDonald, William H., 4,091,050, Cl. 260-837.00R.
Miller, Richard G., 4,091,172, Cl. 428-630.000.
Prahl, Franz: *See—*
Pollinger, Hans; and Prahl, Franz, 4,090,591, Cl. 188-73.100.
Prasan, Anantaraman R.: *See—*
Anderson, Andrew G.; Greason, William D.; and Prasan, Anantaraman R., 4,091,382, Cl. 340-373.000.
Pratt, Frederick: *See—*
Davies, Robert William; Pratt, Frederick; and Pearse, Michael Gordon, 4,090,912, Cl. 156-502.000.
Price, John W. Swimming pool construction. 4,090,266, Cl. 4-172.190.
Prince, Anthony P., to Outboard Marine Corporation. Single lever remote control. 4,090,598, Cl. 192-.096.
Procter & Gamble Company, The: *See—*
Maguire, Edward John, Jr.; and Pancheri, Eugene J., 4,090,973, Cl. 252-89.00R.
Profera, Charles Edward, to RCA Corporation. Beam forming network. 4,091,387, Cl. 343-754.000.
Profet, Anthony G.: *See—*
Ali, Syed Y.; and Profet, Anthony G., 4,090,453, Cl. 104-273.000.
Properzi, Giulio. Device for extracting wire rod or the like at the outlet end of a rolling mill. 4,090,383, Cl. 72-134.000.
Punja, Nazim, to Imperial Chemical Industries Limited. Insecticidal esters. 4,091,110, Cl. 424-304.000.
Purcell, John Harold: *See—*
Lynch, Ronald; and Purcell, John Harold, 4,091,300, Cl. 310-154.000.

Putnam, Dean H., to Magnagard Equipment Manufacturing Corporation. Diazo film advancing module. 4,091,403, Cl. 354-300.000.

Putter, Rolf; Klag, Gunther; and Blank, Heinz Ulrich, to Bayer Aktiengesellschaft. Process for preparing 1-amino-naphthalene-7-sulphonic acid. 4,091,013, Cl. 260-508.000.

Pyle, Edwin G. Ladder lock. 4,090,587, Cl. 182-206.000.

Pyott-Boone Machinery Corporation: *See—*
Teti, John J., 4,090,627, Cl. 214-506.000.

Quarderer, George J.: *See—*
Moll, Norman G.; and Quarderer, George J., 4,090,943, Cl. 208-10.000.

Quirk, James F., to Westinghouse Electric Corp. Semiconductor binding tape and an electrical member wrapped therewith. 4,091,139, Cl. 428-244.000.

Rabinowitz, Mario; and Pachot, James Joseph, to Electric Power Research Institute, Inc. Evaporation-cooled transmission line system. 4,091,230, Cl. 174-15.00C.

Racor Industries, Inc.: *See—*
Richards, Mark S.; and Zeff, Robert, 4,091,265, Cl. 219-501.000.

Rademachers, Jakob; Hund, Franz; Pflugmacher, Ingo; and Winter, Gerhard, to Bayer Aktiengesellschaft. Production of black iron oxide pigments. 4,090,888, Cl. 106-304.000.

Rager, Edgar A. Handle assembly for disk cartridges and the like. 4,090,609, Cl. 206-444.000.

Rainmatic International, Ltd.: *See—*
Hegemann, Kenneth J., 4,090,528, Cl. 137-344.000.

Rainville, Frederick. Game saver device. 4,091,383, Cl. 340-384.00R.

Rajput, Yudh Vir, to B. F. Goodrich Company, The. Anti-skid brake control system with circuit for monitoring slower wheel. 4,090,741, Cl. 303-96.000.

Ralston, Philip G., Jr.: *See—*
Cammarata, Frank, III; Miller, Joe A.; and Ralston, Philip G., Jr., 4,090,541, Cl. 150-.500.

Ralston Purina Company: *See—*
Hawley, Robert Lyle, 4,091,121, Cl. 426-603.000.

Ramanathan, Visvanathan: *See—*
Schlesinger, Ulrich; and Ramanathan, Visvanathan, 4,091,025, Cl. 260-294.80F.

Rampe, John F., to Rampe Research. Suspension system for bowl-type vibratory finishing machine. 4,090,332, Cl. 51-163.200.

Rampe Research: *See—*
Rampe, John F., 4,090,332, Cl. 51-163.200.

Rampel, Hans, to Metallwerk Max Brose GmbH & Co. Window operating mechanism. 4,090,329, Cl. 49-352.000.

Ramsay, David William Crichton: *See—*
Andrew, Herbert Francis; Ramsay, David William Crichton; and Stead, Cecil Vivian, 4,091,021, Cl. 260-191.000.

Rankin, E. Edward, to Petro-Data C.A. Wireline sealing apparatus and method for use with a drill string. 4,090,573, Cl. 175-45.000.

Rao, M. L. Bhaskara; and Schlaikjer, Carl R., to P.R. Mallory & Co. Inc. Lithium SO_2 cell. 4,091,152, Cl. 429-105.000.

Raquel, Edward M. Fish stringer. 4,090,651, Cl. 224-7.00E.

Rau Fasteners, a division of U.S. Industries, Inc.: *See—*
Silverbush, Herbert M., 4,090,652, Cl. 227-18.000.

Rauschenfels, Eberhard, to Dyckerhoff Zementwerke Aktiengesellschaft. Glassy calcium silicate fibers made from phosphorus slag. 4,090,882, Cl. 106-99.000.

Rauschenfels, Eberhard, to Dyckerhoff Zementwerke Aktiengesellschaft. Building material reinforced with fibers of glassy calcium silicate. 4,090,883, Cl. 106-99.000.

Rausing, Gad Anders, to Tetra Pak Developpement SA. Package intended for pressurized contents. 4,090,343, Cl. 53-27.000.

Raven Industries, Inc.: *See—*
Parsons, Roger R., 4,090,682, Cl. 244-99.000.

Raymond Lee Organization, Inc., The: *See—*
Pears, Roy A., 4,090,586, Cl. 182-204.000.
Schlesener, Milton E., 4,090,665, Cl. 238-86.000.

Raynovic, Samuel G., to Honeywell Information Systems Inc. Cathode ray display intensity modulator. 4,091,312, Cl. 315-383.000.

RCA Corporation: *See—*
Barbin, Robert Lloyd, 4,091,347, Cl. 335-212.000.
Berard, Clement Alphonse, 4,091,430, Cl. 361-43.000.
Berkman, Samuel; Kim, Kyong-Min; and Temple, Harold Edgar, 4,090,851, Cl. 23-273.0SP.
Dresner, Joseph; and Hang, Kenneth Warren, 4,091,144, Cl. 428-328.000.
Heckman, LeRoy Francis, Jr., 4,091,337, Cl. 331-101.000.
Keller, Kenneth Robert, 4,090,915, Cl. 156-628.000.
Lewis, William Newman, 4,091,406, Cl. 357-54.000.
Profera, Charles Edward, 4,091,387, Cl. 343-754.000.
Sechi, Franco Nicola, 4,091,334, Cl. 330-287.000.
Wang, Chih Chun; Lausman, Thomas Clifford; and Bates, Ronald Frank, 4,090,758, Cl. 316-2.000.
Wheatley, Carl Franklin, Jr., 4,091,409, Cl. 357-68.000.
Williams, Robert Powell; and Polinsky, Murray Arthur, 4,091,407, Cl. 357-54.000.
Wittke, James Pleister, 4,090,777, Cl. 350-96.150.

Re, Luciano: *See—*
Zappelli, Piergiorgio; Rossodivita, Antonio; Pappa, Rosario; and Re, Luciano, 4,091,203, Cl. 536-26.000.

Reader, Grant W.: *See—*
Rokach, Joshua; Rooney, Clarence S.; Reader, Grant W.; and Cragoe, Edward J., Jr., 4,091,105, Cl. 424-270.000.

Reardon Smith Exploration Limited: *See—*
Bell, Arthur Oswald; and Reardon Smith, William Antony John, 4,090,368, Cl. 61-93.000.

Reardon Smith, William Antony John: *See—*
Bell, Arthur Oswald; and Reardon Smith, William Antony John, 4,090,368, Cl. 61-93.000.

Rebo-Produkter: *See—*
Segersten, Goran, 4,090,510, Cl. 128-146.600.

Reda Exercisers, Inc.: *See—*
Reda, Ronald J., 4,090,706, Cl. 272-137.000.

Reda, Ronald J., to Reda Exercisers, Inc. Belt tension exerciser. 4,090,706, Cl. 272-137.000.

Reed, Russell; and Stanton, Horace D., to United States of America, Navy. Moldable ethylene/vinyl acetate copolymer. 4,090,894, Cl. 149-19.910.

Reed Tool Company: *See—*
Barker, Lynn M., 4,090,489, Cl. 125-13.00R.

Reeves, Adam A., to Paraho Corporation. Method of operating an oil shale kiln. 4,090,945, Cl. 208-11.00R.

Reh, Lothar; Plass, Ludolf; and Marchessaux, Philippe, to Aluminum Pechiney. Process for thermal decomposition of aluminum chloride hydrates by indirect heat. 4,091,085, Cl. 423-625.000.

Reibetanz, Wilbert: *See—*
Wanner, Karl; Paule, Kurt; Adam, Hermann; and Reibetanz, Wilbert, 4,090,297, Cl. 30-124.000.

Reich, Fritz, to Georg Fischer A.G. Thermoplastics welding method. 4,090,899, Cl. 156-79.000.

Reidemeister, Iraida Ivanovna: *See—*
Babasov, Mikhail Vladimirovich; Zazimko, Viktor Afanasievich; Reidemeister, Iraida Ivanovna; Semenenko, Jury Lukich; Pertsikov, Zelik Ilich; Levin, Mikhail Samuilovich; Eremeev, Valery Konstantinovich; and Varava, Leonid Mikhailovich, 4,090,381, Cl. 72-68.000.

Reifert, Charles W., to Grain Processing Corporation. Cover construction. 4,090,604, Cl. 198-861.000.

Reighter, David H., to Gould Inc. Method of producing an improved concrete electrical insulator. 4,091,124, Cl. 427-58.000.

Reiner, Roland: *See—*
Montavon, Marc; and Reiner, Roland, 4,091,211, Cl. 544-21.000.

Renbarger, Romaine L., to Goodyear Tire & Rubber Company, The. Apparatus for assembling force-fit components. 4,090,295, Cl. 29-789.000.

Renegar, Charles Gwin, to Hasbro Industries, Inc. Die for conditioning an extrudate. 4,090,828, Cl. 425-71.000.

Rengo Co., Ltd.: *See—*
Okada, Toshio; Ohtsuki, Hideharu; Inagaki, Hiroshi; Hanyuda, Toshiaki; Tokuno, Masateru; and Igarashi, Seiichi, 4,091,167, Cl. 428-413.000.

Renholmens Mekaniska Verkstad AB: *See—*
Marklund, Erland, 4,090,603, Cl. 198-460.000.

Research Corporation: *See—*
Dubin, Stephen, 4,090,977, Cl. 252-408.000.

Reynolds, Harold C., Jr.: *See—*
Angelbeck, Albert Wolcott; Vinje, Edward Wayne; Wisner, George Robert; Freeman, Ronald Harold; Reynolds, Harold C., Jr.; and Witt, Donald Lee, 4,091,274, Cl. 250-201.000.

Reynolds Metals Company: *See—*
Foster, Walter W.; French, William H.; and Lindberg, Ramon I., 4,091,291, Cl. 307-95.000.

Reynolds, Ronald W., to Sun Petroleum Products Company. Process for manufacturing refrigeration oils. 4,090,950, Cl. 208-89.000.

Rhee, Dennis W.; and Srivastava, Gopal K. Combination contrast/brightness control for a television receiver. 4,091,419, Cl. 358-168.000.

Rhyner, Heinz; Balleys, Francois; and Marendaz, Georges-Andre, to Ateliers des Charmilles S.A. Process and apparatus for monitoring the electrical discharge efficiency of an EDM machine. 4,090,961, Cl. 219-69.00C.

Richards, Mark S.; and Zeff, Robert, to Racor Industries, Inc. Fuel filter heating assembly. 4,091,265, Cl. 219-501.000.

Richardson, Edwin A.: *See—*
Lybarger, James H.; Richardson, Edwin A.; Scheuerman, Ronald F.; and Templeton, Charles C., 4,090,563, Cl. 166-307.000.

Richter, Heinz; and Peetz, Heinz, to Loewe-Opta GmbH. Infra-red remote controlled command system for a communications receiver. 4,091,272, Cl. 250-199.000.

Richtzenhain, Hermann; and Riegger, Paul, to Dynamit Nobel Aktiengesellschaft. Method of preparing terephthalic acid dichloride and isophthalic acid dichloride. 4,091,017, Cl. 260-544.00D.

Ricoh Co., Ltd.: *See—*
Endo, Katutoshi; and Ohira, Makoto, 4,091,145, Cl. 428-546.000.
Okazaki, Mitsuo; Yamaguchi, Akihiro; and Sasaki, Masaomi, 4,091,208, Cl. 542-454.000.

Rideout, Vincent Leo: *See—*
Dennard, Robert Heath; and Rideout, Vincent Leo, 4,090,289, Cl. 29-571.000.

Riedel, Wolfgang, to Volkswagenwerk Aktiengesellschaft. Bumper arrangement. 4,090,728, Cl. 293-71.00R.

Riegger, Paul: *See—*
Richtzenhain, Hermann; and Riegger, Paul, 4,091,017, Cl. 260-544.00D.

Riethmuller, Jacques; and Vasseur, Jean Pierre, to Thomson-CSF. Apparatus for displaying a section of a body subjected to penetrating radiation, in particular X rays or gamma rays. 4,091,416, Cl. 358-111.000.

Riggs, William F.; Veloz, Jaime; and Dahlberg, Harry R., to Inspiration Consolidated Copper Company. Recovery of copper. 4,091,070, Cl. 423-41.000.

Riley, James R.; and Riley, Sarah M., to Riley, James Ross. Easy clean barbeque grill. 4,090,490, Cl. 126-25.00R.

Riley, James Ross: *See—*
Riley, James R.; and Riley, Sarah M., 4,090,490, Cl. 126-25.00R.
Riley, Sarah M.: *See—*
Riley, James R.; and Riley, Sarah M., 4,090,490, Cl. 126-25.00R.
Rindfleisch, Volker: *See—*
Muller, Karl-Heinz; Schliepe, Reinhard; and Rindfleisch, Volker, 4,091,374, Cl. 340-324.0AD.
Rishel, James P., to Austin Powder Company. Method of packaging an extrudable explosive composition. 4,090,342, Cl. 53-23.000.
Ritter, Arthur J., Jr., to Caterpillar Tractor Co. Nut locking means. 4,090,545, Cl. 151-28.000.
Robert Bosch GmbH: *See—*
Stumpp, Gerhard; and Grieshaber, Hermann, 4,090,486, Cl. 123-139.0AW.
Stumpp, Gerhard; and Grieshaber, Hermann, 4,090,487, Cl. 123-140.0MP.
Wanner, Karl; Paule, Kurt; Adam, Hermann; and Reibetanz, Wilbert, 4,090,297, Cl. 30-124.000.
Roberts, Arthur W., Jr., to Inta-Roto, Inc. Breast roller pivoting. 4,090,469, Cl. 118-410.000.
Roberts, Glendell. Multi-purpose garden tool. 4,090,457, Cl. 111-82.000.
Roberts, Gordon, to Glen Walton Company Limited. Textile carding. 4,090,276, Cl. 19-99.000.
Roberts, M. F., to Bloomfield Industries, a Division of Beatrice Foods Co. Decanter and molded interlocking handle. 4,090,648, Cl. 222-570.000.
Roberts, Paul C., to United States of America, Navy. Pressure responsive fluid bag ejector. 4,090,458, Cl. 114-20.00R.
Robertshaw Controls Company: *See—*
Sepso, Roger P., 4,090,286, Cl. 29-454.000.
Robertson, Melvin W.; and Wenzel, William L. Circuit breaker protected electrical receptacle. 4,091,352, Cl. 337-187.000.
Robillard, Jean Jules, to Laboratoires de Physicochimie Appliquee, ISSEC S.A. Flat screen solid state display and memory device utilizing color centers. 4,091,375, Cl. 340-324.00R.
Rock, Erich; and Mages, Bernhard, to Julius Blum Gesellschaft m.b.H. Fastening device. 4,090,753, Cl. 312-140.000.
Rockwell International Corporation: *See—*
Booher, Robert K., 4,091,461, Cl. 365-154.000.
Chen, Thomas T., 4,091,362, Cl. 365-1.000.
George, Peter K., 4,091,458, Cl. 365-12.000.
Huntsinger, Dean P., 4,091,381, Cl. 340-347.0AD.
Jovick, Raymond John; and Malott, Roger James, 4,090,592, Cl. 188-181.00R.
Sutherland, Ray, 4,090,527, Cl. 137-215.000.
Rodder, Jerome A. Sensor. 4,090,406, Cl. 73-204.000.
Rodewald, Paul G., to Mobile Oil Corporation. Catalyst for selective production of para dialkyl substituted benzenes. 4,090,981, Cl. 252-455.00Z.
Rodriguez, Ludovic; and Leclercq, Jacques, to U C B Societe Anonyme. 6'-Amino-spiro(cycloalkane-1,2'-penam)-3'-carboxylic acids. 4,091,027, Cl. 260-306.70C.
Roehrich, Christian: *See—*
Siddiqi, Iqbal; Suva, Tito; and Roehrich, Christian, 4,090,791, Cl. 356-184.000.
Roelofs, Glenn E., to Minnesota Mining and Manufacturing Company. Coextruded polyester splicing tape. 4,091,150, Cl. 428-57.000.
Rogers, Edward F.: *See—*
Graham, Donald W.; and Rogers, Edward F., 4,091,094, Cl. 424-180.000.
Rogoff, Gerald L., to Westinghouse Electric Corp. Process for isotope separation employing cataphoresis. 4,090,856, Cl. 55-11.000.
Rohm GmbH: *See—*
Bauer, Peter; Fischer, Udo; and Hosch, Ludwig, 4,090,773, Cl. 350-1.600.
Rohr Industries, Inc.: *See—*
Koss, Muriel L., 4,091,160, Cl. 428-245.000.
Rokach, Joshua; Rooney, Clarence S.; Reader, Grant W.; and Cragoe, Edward J., Jr., to Merck & Co., Inc. 2-Imino-3-aminothiazolidines and indoleamine-N-methyltransferase inhibition. 4,091,105, Cl. 424-270.000.
Rollei-Werke Franke & Heidecke: *See—*
Schneider, Arthur, 4,091,308, Cl. 315-151.000.
Rollett, John Mortimer: *See—*
Greaves, Alan John; Greenaway, Phillip Ernest; and Rollett, John Mortimer, 4,091,340, Cl. 331-132.000.
Greaves, Alan John; Greenaway, Phillip Ernest; and Rollett, John Mortimer, 4,091,341, Cl. 331-132.000.
Rollins, James E. Filter drying apparatus. 4,090,309, Cl. 34-58.000.
Romer-Wingard Autogurte GmbH: *See—*
Czernakowski, Waldemar, 4,090,735, Cl. 297-388.000.
Rooney, Clarence S.: *See—*
Rokach, Joshua; Rooney, Clarence S.; Reader, Grant W.; and Cragoe, Edward J., Jr., 4,091,105, Cl. 424-270.000.
Roos, Charles Edwin: *See—*
Limb, John Ormond; and Roos, Charles Edwin, 4,091,415, Cl. 358-105.000.
Roovers, Antonius Henricus Albertus Maria: *See—*
Kuijpers, Franciscus Antonius; van den Enden, Adrianus Wilhelmus Maria; and Roovers, Antonius Henricus Albertus Maria, 4,091,459, Cl. 365-13.000.
Roper, Wilbur F.: *See—*
Kelly, John, Jr.; and Roper, Wilbur F., 4,090,523, Cl. 134-18.000.
Ropte, Eckhard: *See—*
Sander, Bruno; Scherling, Kurt; Steinberger, Rolf; and Ropte, Eckhard, 4,091,058, Cl. 264-11.000.
Rosas, Jorge E.: *See—*
Poling, George W.; and Rosas, Jorge E., 4,090,867, Cl. 75-2.000.
Rose, Millard F.; and Mazzie, John A., to United States of America, Navy. Ferroelectric pulsed power source. 4,090,448, Cl. 102-70.2GA.
Rose, Neil M.: *See—*
Ackers, Stephen B.; and Rose, Neil M., 4,090,673, Cl. 241-275.000.
Rosenstock, Walter: *See—*
Gollmick, Hans-Joachim; Klinkhart, Karl; Morzinek, Herbert; Bereiter, Wolfgang; and Rosenstock, Walter, 4,090,307, Cl. 34-9.000.
Ross, Donald R., Jr. Trolley rail. 4,090,594, Cl. 191-23.00A.
Rossetti, Susan. Educational game. 4,090,717, Cl. 273-249.000.
Rossi, Eugene F., to Allis-Chalmers Corporation. Support for reduction kiln gas-on system independently of firing hood. 4,090,842, Cl. 432-115.000.
Rossler, Bernward, to Siemens Aktiengesellschaft. Modular logic circuit utilizing charge-storage transistors. 4,091,359, Cl. 340-166.00R.
Rossmy, Gerd: *See—*
Koerner, Gotz; and Rossmy, Gerd, 4,090,987, Cl. 260-2.5AH.
Rossodivita, Antonio: *See—*
Zappelli, Piergiorgio; Rossodivita, Antonio; Pappa, Rosario; and Re, Luciano, 4,091,203, Cl. 536-26.000.
Roszyk, Leon M.; Mammen, H. William; and Buchner, John B., to Sunbeam Corporation. Windshield wiper control apparatus. 4,091,317, Cl. 318-369.000.
Roth, Walter L.: *See—*
Farrington, Gregory C.; and Roth, Walter L., 4,091,182, Cl. 429-101.000.
Roussel Uclaf: *See—*
Buendia, Jean; and Vivat, Michel, 4,091,226, Cl. 560-122.000.
Nedelec, Lucien; Pierdet, Andre; Dumont, Claude; and Kannengiesser, Marie-Helene, 4,091,115, Cl. 424-330.000.
Rowland, Stanley P., to United States of America, Agriculture. Process of producing high performance durable-press cotton. 4,090,844, Cl. 8-120.000.
Roy, Jacques: *See—*
Dupont, Jean-Pierre; Gregoire, Jean-Francois; Ligier, Michel; and Roy, Jacques, 4,090,404, Cl. 73-119.00A.
Ruch, Jean; and Hasenauer, Dieter, to Accumulatorenwerk Hoppecke Carl Zoellner & Sohn. Electrochemical battery. 4,091,174, Cl. 429-27.000.
Ruf, Max, to Audi NSU Auto Union Aktiengesellschaft. Fluid-cooled rotary piston for Wankel-type mechanism. 4,090,823, Cl. 418-94.000.
Ruf, Max, to Audi NSU Auto Union Aktiengesellschaft. Rotary piston engine piston having an internal seal. 4,090,824, Cl. 418-142.000.
Runyan, John G.; and Kline, James H. Bale loader. 4,090,616, Cl. 214-1.0HH.
Rupilius, Wolfgang: *See—*
Petzold, Manfred; Grunert, Heinz; Rupilius, Wolfgang; and Rutzen, Horst, 4,090,845, Cl. 8-169.000.
Rushforth, Harold E. Golf tee awl. 4,090,298, Cl. 30-368.000.
Rusich, Anthony. Sail boat mast containing sail furling device with swivel haul-up means. 4,090,461, Cl. 114-107.000.
Rusling, Douglas: *See—*
Dexter, Robin William; and Rusling, Douglas, 4,090,955, Cl. 209-5.000.
Ruti-Te Strake B.V.: *See—*
Van Mullekom, Hubert Peter, 4,090,536, Cl. 139-452.000.
Rutkowski, Eugene V.: *See—*
Ogren, John R.; Ogle, Gilbert J.; and Rutkowski, Eugene V., 4,090,979, Cl. 252-441.000.
Rutzen, Horst: *See—*
Koch, Karlheinz; and Rutzen, Horst, 4,090,969, Cl. 252-8.55D.
Petzold, Manfred; Grunert, Heinz; Rupilius, Wolfgang; and Rutzen, Horst, 4,090,845, Cl. 8-169.000.
Ryan, Charles P., to Honeywell Information Systems Inc. Program switching monitor. 4,091,445, Cl. 364-200.000.
Rybar, Vaclav; Drapal, Radovan; and Kabelik, Radim, to Stav, Praha, vyrobni stavebni druzstvo stredisko Monta. Method and apparatus for the combustion of gaseous or liquid fuels. 4,090,476, Cl. 122-367.0PF.
Ryder, Leonard Benoit. Method for blow molding and cooling plastic articles. 4,091,059, Cl. 264-28.000.
Rylewski, Eugeniusz M. Plate with passages for fluid rotative machines. 4,090,825, Cl. 418-178.000.
S. A. Platt, Inc.: *See—*
Platt, Stephen A., 4,090,425, Cl. 83-402.000.
S. E. Rykoff & Co.: *See—*
Kwan, Philip H., 4,090,475, Cl. 222-70.000.
Saar, Raymond K. Tennis racquet sounding device. 4,090,707, Cl. 273-29.00A.
Saari, Walfred S.: *See—*
Lumma, William C., Jr.; and Saari, Walfred S., 4,091,101, Cl. 424-250.000.
Sabnis, Ajit V.: *See—*
Dohogne, James R.; and Sabnis, Ajit V., 4,090,745, Cl. 308-10.000.
Sack, George: *See—*
Kurowski, Benedict; and Sack, George, 4,090,334, Cl. 51-427.000.
Sahara, Masayoshi; Matsuda, Motonobu; and Ohta, Yoshiharu, to Minolta Camera Kabushiki Kaisha. Camera exposure control and indicating circuitry responsive to a signal from a flash device. 4,091,396, Cl. 354-23.00D.
Saidla, Glen E. W., to Exxon Research & Engineering Co. Apparatus for forming large reinforced foamed plastic panels. 4,090,833, Cl. 425-451.000.

Saito, Etsuro; and Takahashi, Katsumasa, to Sony Corporation. Rotary head assembly. 4,091,428, Cl. 360-104.000.

Saito, Fumio; Yamai, Fumito; Beppu, Yositugu; and Nakayama, Shinpei, to Sekisui Kagaku Kogyo Kabushiki Kaisha; and Sekisui Kaseihin Kogyo Kabushiki Kaisha. Process of preparing styrenic polymer particles. 4,091,054, Cl. 260-886.000.

Saitoh, Michio: *See—*
Nagano, Mineo; Saitoh, Michio; Awazawa, Shigeru; and Tanaka, Koji, 4,090,994, Cl. 260-31.80R.

Sakaida, Kaku, to Trio Kabushiki Kaisha. Stereo indicating circuit for an FM receiver. 4,091,241, Cl. 179-15.0BT.

Saleil, Jean: *See—*
Antoine, Lucien; Leroy, Pierre; and Saleil, Jean, 4,090,869, Cl. 75-12.000.

Salen & Wicander Terminalsystem AB: *See—*
Johansson, Anders; and Strombeck, Per, 4,090,620, Cl. 214-16.00B.

Salimbeni, Aldo: *See—*
Manghisi, Elso; Salimbeni, Aldo; and Mennella, Pietro, 4,091,222, Cl. 544-148.000.

Salisbury, T. W., III: *See—*
Shuler, Cobia B.; and Moore, Wesley E., Jr., 4,090,407, Cl. 73-290.00V.

Salm, Max: *See—*
Bloch, Heinz; and Salm, Max, 4,091,450, Cl. 364-494.000.

Salonimer, David J., to United States of America, Army. Target designation system. 4,091,412, Cl. 358-108.000.

Samuels, Ira; and Barzman, Sidney, to Beacon Computer Corp. Automatic telephone call computer and display. 4,091,238, Cl. 179-7.10R.

Sanada, Seiji; and Isono, Katsuo, to Sony Corporation. Color hue control circuit for color television receiver. 4,091,411, Cl. 358-28.000.

Sandell, Lionel Samuel: *See—*
Marquisee, Mark James; and Sandell, Lionel Samuel, 4,090,887, Cl. 106-288.00B.

Sander, Bruno; Scherling, Kurt; Steinberger, Rolf; and Ropte, Eckhard, to BASF Aktiengesellschaft. Manufacture of fibrids from poly(a-mide-imide) resins. 4,091,058, Cl. 264-11.000.

Sandoz Ltd.: *See—*
Fehr, Theodor; and Stadler, Paul, 4,091,099, Cl. 424-250.000.

Sandvik Aktiebolag: *See—*
Faber, Kurt Heinrich Albert Erich, 4,090,801, Cl. 407-113.000.

Sandvik Special Metals Corporation: *See—*
Naylor, Tom D.; and Matinlassi, Ulf A., 4,090,386, Cl. 72-208.000.

Sanki Kogyo Kabushiki Kaisha: *See—*
Yamamoto, Mamoru, 4,091,255, Cl. 219-84.000.

Sanno, Yasushi: *See—*
Ishiguro, Toshihiro; and Sanno, Yasushi, 4,091,220, Cl. 544-121.000.

Sano, Ryujiro: *See—*
Chibata, Ichiro; Tosa, Tetsuya; Mori, Takao; Watanabe, Taizo; Sano, Ryujiro; and Matuo, Yuhsi, 4,090,919, Cl. 195-63.000.

Saporta, Yaacov: *See—*
Mushin, Aaron; and Saporta, Yaacov, 4,090,325, Cl. 47-9.000.

Sapozhnikov, Fedor Vasilievich: *See—*
Golovanov, Nikolai Vasilievich; Ivanov, Vitaly Alexandrovich; Mitor, Vyacheslav Vladimirovich; Parshin, Anatoly Alexeevich; Sapozhnikov, Fedor Vasilievich; Ter-Minosian, Sergei Mikhailovich; and Chavchanidze, Evgeny Kirillovich, 4,090,473, Cl. 122-6.00A.

Sarcia, Domenico S., to Seal Incorporated. Heat transfer. 4,091,264, Cl. 219-469.000.

Sargis, John R.: *See—*
Nitschneider, Robert M.; Sargis, John R.; and Abrams, Martin, 4,090,690, Cl. 254-28.000.

Sasaki, Masaomi: *See—*
Okazaki, Mitsuo; Yamaguchi, Akihiro; and Sasaki, Masaomi, 4,091,208, Cl. 542-454.000.

Sasaki, Takehiko: *See—*
Maeda, Hidetoshi; and Sasaki, Takehiko, 4,090,353, Cl. 58-85.500.

Sassi, Enzo, to Crompton & Knowles Corporation. Fabric printing machine with impression cylinder washing. 4,090,445, Cl. 101-425.000.

Sata, Toshikatsu: *See—*
Motani, Kensuke; Sata, Toshikatsu; and Nishimura, Masakatsu, 4,090,931, Cl. 204-98.000.

Satchell, Donald P., Jr., to Continental Oil Company. Hydrogen donor diluent cracking process. 4,090,947, Cl. 208-56.000.

Sato Koki K.K.: *See—*
Iida, Yozo; Kawahara, Yasuhito; and Igarashi, Shigemi, 4,091,398, Cl. 354-145.000.

Sato, Setsuo: *See—*
Fujita, Hisaya; Kaieda, Nobuo; and Sato, Setsuo, 4,091,389, Cl. 346-32.000.

Sato, Shoichi; and Oda, Shizuo, to Bunker Ramo Corporation. Soldering iron and method for soldering a plurality of wires to a connector. 4,090,656, Cl. 228-180.00R.

Sattler, Frederick P.: *See—*
Hancock, Warren D.; and Sattler, Frederick P., 4,090,878, Cl. 69-29.000.

Sauer, Hans: *See—*
Nishimura, Hiromi; Ono, Kenji; and Shibata, Minoru, 4,091,346, Cl. 335-78.000.

Sava, Cornel Doru: *See—*
Teodorescu, Constantin; Chiriac, Ilie; Sava, Cornel Doru; Draghici, Adrian; and Zinca, Sabin, 4,090,814, Cl. 417-178.000.

Savio e C. S.p.A.: *See—*
Savio, Ermanno; Calamani, Sergio; and Turri, Eugenio, 4,090,677, Cl. 242-47.010.

Savio, Ermanno; Calamani, Sergio; and Turri, Eugenio, to Savio e C. S.p.A. Apparatus for storing and feeding yarn to yarn using machines. 4,090,677, Cl. 242-47.010.

Sawamura, Ichiro; Sogi, Shinroku; Kamachi, Shin-ichi; Yoshinaga, Makoto; Goto, Atsuo; Izawa, Masao; Nakajima, Yoshio; Gocho, Nagahiro; Shinohara, Toshio; and Hattori, Shin-ichiro, to Olympus Optical Co., Ltd. Automatic cultivating apparatus. 4,090,921, Cl. 195-127.000.

Sawanishi, Shigeru: *See—*
Suzuki, Hiroshi; Sawanishi, Shigeru; and Kusunose, Takamaro, 4,091,066, Cl. 264-182.000.

Saxon, Robert: *See—*
Li, Tsi Tieh; and Saxon, Robert, 4,091,002, Cl. 260-75.00S.

Scanley, Clyde S., to Drew Chemical Corp. Dispersions of water soluble polymers in oil. 4,090,992, Cl. 260-29.6AT.

Schaar, Charles H., to Colgate-Palmolive Company. Diaper with elastic fastener tab. 4,090,516, Cl. 128-287.000.

Schachte, John J.: *See—*
Zankl, Frank; Kirkham, Edward E.; Stobbe, Richard E.; and Schachte, John J., 4,091,294, Cl. 318-227.000.

Schaeffer, Donna Jean: *See—*
Enzenauer, Sharon Sue; and Schaeffer, Donna Jean, 4,090,689, Cl. 254-7.00R.

Schaeuble, Edwin K., to Paper Converting Machine Company. Method and apparatus for coating using an open-ended ink chamber having restrictions for partially limit ink flow. 4,091,129, Cl. 427-345.000.

Scharf, Daniel J.; and Chamberlin, Howard A., to Hooker Chemicals & Plastics Corp. Process for sequestering metal ions. 4,090,959, Cl. 210-58.000.

Scheibel, Edward, to Suntech, Inc. Hydrolysis of ethylene glycol acetates. 4,091,039, Cl. 568-858.000.

Schena, Kenneth R.; and Selley, Michael, to Schena, Kenneth R. Catalyst generator. 4,090,838, Cl. 431-4.000.

Scherling, Kurt: *See—*
Sander, Bruno; Scherling, Kurt; Steinberger, Rolf; and Ropte, Eckhard, 4,091,058, Cl. 264-11.000.

Scheuerman, Ronald F.: *See—*
Lybarger, James H.; Richardson, Edwin A.; Scheuerman, Ronald F.; and Templeton, Charles C., 4,090,563, Cl. 166-307.000.

Scheul, Franz: *See—*
List, Franz; and Scheul, Franz, 4,090,363, Cl. 61-31.000.

Schick, Gunther. Sensing device for counting workpieces transported in stepped formation. 4,091,269, Cl. 235-98.00B.

Schieber, Michael M., to United States of America, Energy. Purification of HgI_2 for nuclear detector fabrication. 4,091,084, Cl. 423-491.000.

Schiess, Eduard: *See—*
Tschudy, Roland; and Schiess, Eduard, 4,091,463, Cl. 366-298.000.

Schillig, Henning: *See—*
Flossdorf, Josef; and Schillig, Henning, 4,090,795, Cl. 356-246.000.

Schlaikjer, Carl R.: *See—*
Rao, M. L. Bhaskara; and Schlaikjer, Carl R., 4,091,152, Cl. 429-105.000.

Schlegel Corporation: *See—*
Metzler, Jay C., 4,090,910, Cl. 156-430.000.

Schlesener, Milton E., to Raymond Lee Organization, Inc., The. Reinforced concrete tie with embedded rail clamp means. 4,090,665, Cl. 238-86.000.

Schlesinger, Sheldon Irwin; and Boszak, Ronald J., to American Can Company. Dry photopolymer imaging process. 4,091,194, Cl. 526-24.000.

Schlesinger, Ulrich; and Ramanathan, Visvanathan, to Ciba-Geigy AG. Process for the manufacture of nitroaminopyridines. 4,091,025, Cl. 260-294.80F.

Schliepe, Reinhard: *See—*
Muller, Karl-Heinz; Schliepe, Reinhard; and Rindfleisch, Volker, 4,091,374, Cl. 340-324.0AD.

Schmid, Herbert: *See—*
Watson, Alan; Hohmann, Peter; Schmid, Herbert; and Schneider, Helmut, 4,091,008, Cl. 260-450.000.

Schmidt, Oskar, to Lim-Holding S.A. Pneumatic tire for vehicles. 4,090,547, Cl. 152-354.00R.

Schmidt, Oskar, to Lim Holding S.A. Polyurethane elastomers based on heterocyclic polyester diols. 4,091,000, Cl. 260-75.0NQ.

Schmitt, Donald J.: *See—*
Deubel, Bernard S.; and Schmitt, Donald J., 4,091,354, Cl. 337-343.000.

Schneider, Alan Arthur, to Catalyst Research Corporation. Method for encapsulating a corrosive material with lithium. 4,090,291, Cl. 29-623.100.

Schneider, Arthur, to Rollei-Werke Franke & Heidecke. Electronic photographic flash apparatus. 4,091,308, Cl. 315-151.000.

Schneider, Helmut: *See—*
Watson, Alan; Hohmann, Peter; Schmid, Herbert; and Schneider, Helmut, 4,091,008, Cl. 260-450.000.

Schneiter, Ali, to Ebauches S.A. Counting mechanism for timepiece. 4,090,354, Cl. 58-117.000.

Schoeller & Co.: *See—*
Gollmick, Hans-Joachim; Klinkhart, Karl; Morzinek, Herbert; Bereiter, Wolfgang; and Rosenstock, Walter, 4,090,307, Cl. 34-9.000.

Schoeppel, Roger J.: *See—*
Terry, Lynn E.; and Schoeppel, Roger J., 4,090,361, Cl. 60-649.000.

Scholle Corporation: *See*—
Scholle, William R., 4,091,192, Cl. 429-211.000.
Scholle, William R., to Scholle Corporation. Paired battery grids with severable brace, plastic lugs, and lead lug. 4,091,192, Cl. 429-211.000.
Schornig, Eberhard; and Naumann, Gerhard, to Hoechst Aktiengesellschaft. Apparatus for developing photosensitive material. 4,091,404, Cl. 354-321.000.
Schott, Donald E., to Thomas C. Wilson, Inc. Expanding and beading apparatus for tubes and the like. 4,090,382, Cl. 72-119.000.
Schram, Robert A.; Affrunti, Alfred, Jr.; and Affrunti, Angela. Disposable drinking cup lid. 4,090,660, Cl. 229-43.000.
Schreiber, William L.; Siano, James N.; Vock, Manfred Hugo; and Shuster, Edward J., to International Flavors & Fragrances Inc. 1-(3,3-Dimethyl-2-norbornyl)-2-propanone perfume compositions. 4,090,985, Cl. 252-522.000.
Schroter, Jurgen: *See*—
Bauer, Kurt; Brandt, Hans-Walter; and Schroter, Jurgen, 4,090,922, Cl. 203-48.000.
Schubert, Bernhard; and Bardenhagen, Dietrich, to Hauni-Werke Korber & Co. KG. Tip turning apparatus for cigarettes or the like. 4,090,602, Cl. 198-377.000.
Schuermeyer, Fritz L.; and Young, Charles R., to United States of America, Air Force. Quasi static, virtually nonvolatile random access memory cell. 4,091,460, Cl. 365-154.000.
Schuller, Ronald A.; and Glahn, Robert J. Clapper seal for check valves. 4,090,529, Cl. 137-516.290.
Schultz, Robert G., to Monsanto Company. Production of dihydroxydiphenyl alkanes. 4,091,038, Cl. 568-729.000.
Schulze, Klaus: *See*—
Farwer, Alfward; Kujawa, Wolfgang; and Schulze, Klaus, 4,091,189, Cl. 429-181.000.
Schwartz, Albert B.: *See*—
Dwyer, Francis G.; and Schwartz, Albert B., 4,091,007, Cl. 260-448.00C.
Schwartz, Hermann, to Peyer, Siegfried. Method and apparatus to obtain an electrical signal representative of thickness of a traveling filament. 4,091,368, Cl. 340-259.000.
Schwartz, Nelson N., to Air Products and Chemicals, Inc. Protected graft copolymers of cyclic nitrogenous and ester monomers. 4,091,030, Cl. 260-326.250.
Schwarz, Eckhard C. A. Polymer modified hydrophilic inorganic fillers for thermoplastic polymeric materials. 4,091,164, Cl. 428-404.000.
Schwarzbach, Richard J.: *See*—
Siegel, Steve L.; and Schwarzbach, Richard J., 4,091,363, Cl. 340-227.00R.
Schwarzenbek, Eugene F. Catalytic cracking process. 4,090,948, Cl. 208-74.000.
Scrattish, Frank: *See*—
Szakacs, Bela; and Scrattish, Frank, 4,090,550, Cl. 164-70.000.
Seal Incorporated: *See*—
Sarcia, Domenico S., 4,091,264, Cl. 219-469.000.
Sechi, Franco Nicola, to RCA Corporation. Connection of a plurality of devices to a circular waveguide. 4,091,334, Cl. 330-287.000.
Segar, William R., to Westinghouse Electric Corp. Power rail, control signal rail and guide beam arrangement for a transporting system. 4,090,452, Cl. 104-247.000.
Segersten, Goran, to Rebo-Produkter. Face mask with exchangeable filter. 4,090,510, Cl. 128-146.600.
Seidman, Sandor F.: *See*—
Chireau, Roland F.; and Seidman, Sandor F., 4,091,185, Cl. 429-144.000.
Seiko Koki Kabushiki Kaisha: *See*—
Watanabe, Masanori; Onda, Eiichi; Koyama, Mitsuo; Nemoto, Ichiro; and Nakagawa, Tadashi, 4,091,401, Cl. 354-266.000.
Seiko Seiki Kabushiki Kaisha: *See*—
Kikuchi, Shinichi, 4,090,617, Cl. 214-1.0BB.
Seki, Shigeo: *See*—
Umezawa, Hamao; Umezawa, Sumio; Fukatsu, Shunzo; Seki, Shigeo; Murase, Masao; and Yasuda, Shuntaro, 4,091,202, Cl. 536-10.000.
Sekisui Kagaku Kogyo Kabushiki Kaisha: *See*—
Saito, Fumio; Yamai, Fumito; Beppu, Yositugu; and Nakayama, Shinpei, 4,091,054, Cl. 260-886.000.
Sekisui Kaseihin Kogyo Kabushiki: *See*—
Matsui, Takashi, 4,090,903, Cl. 156-211.000.
Sekisui Kaseihin Kogyo Kabushiki Kaisha: *See*—
Saito, Fumio; Yamai, Fumito; Beppu, Yositugu; and Nakayama, Shinpei, 4,091,054, Cl. 260-886.000.
Seko, Maomi: *See*—
Kazihara, Akira; Ogawa, Shinsaku; Kobayashi, Takekuni; and Seko, Maomi, 4,090,932, Cl. 204-98.000.
Selander, Douglas S., to Kearney & Trecker Corporation. Workpiece changer mechanism for a machine tool. 4,090,287, Cl. 29-568.000.
Selley, Michael: *See*—
Schena, Kenneth R.; and Selley, Michael, 4,090,838, Cl. 431-4.000.
Semenenko, Jury Lukich: *See*—
Babasov, Mikhail Vladimirovich; Zazimko, Viktor Afanasievich; Reidemeister, Iraida Ivanovna; Semenenko, Jury Lukich; Pertsikov, Zelik Ilich; Levin, Mikhail Samuilovich; Eremeev, Valery Konstantinovich; and Varava, Leonid Mikhailovich, 4,090,381, Cl. 72-68.000.
Sepso, Roger P., to Robertshaw Controls Company. Fluid operated diaphragm assembly and method of making the same. 4,090,286, Cl. 29-454.000.
Seriu, Naoyuki: *See*—
Kanazawa, Shogo; Nakashima, Akira; Yamato, Kazunari; Seriu, Naoyuki; Watanabe, Tohru; and Nakazawa, Susumu, 4,091,147, Cl. 428-683.000.
Serratore, Joseph; and Clayton, William L., to Exxon Research & Engineering Co. Polymeric stabilizers for polyvinyl chloride resin. 4,091,047, Cl. 260-836.000.
Service Equipment Design Co., Inc.: *See*—
Hauk, Thomas D.; and Konishi, Masato Howard, 4,090,914, Cl. 156-523.000.
Shackle, Dale Richard: *See*—
Davis, Gerald Titus; and Shackle, Dale Richard, 4,091,122, Cl. 427-44.000.
Shafer, Donald E., to Honeywell Inc. Skew correction. 4,091,392, Cl. 346-110.00R.
Shaffer, Myron W., to Thermo-Seal, Inc. Laminating apparatus. 4,090,911, Cl. 156-499.000.
Shah, Chandrakant Shantilal, to Du Pont de Nemours, E. I., and Company. Melt spinning process. 4,091,065, Cl. 264-177.00F.
Shah, Hasmukh R.: *See*—
Jones, Thaddeus M.; Shah, Hasmukh R.; and Nash, Charles D., 4,091,271, Cl. 235-419.000.
Shalaev, Vladimir Grigorievich: *See*—
Vitchenko, Vladimir Stepanovich; Smirnov, Gennady Konstantinovich; and Shalaev, Vladimir Grigorievich, 4,091,299, Cl. 310-71.000.
Sharp Kabushiki Kaisha: *See*—
Maeda, Hidetoshi; and Sasaki, Takehiko, 4,090,353, Cl. 58-85.500.
Maekawa, Koji; and Hamasaki, Iwao, 4,091,376, Cl. 340-336.000.
Morihisa, Mitsuo, 4,091,338, Cl. 331-116.00R.
Shaw, Michael J., to Allied Paper Incorporated. Method for obtaining controlled cure in the coating of papers. 4,091,130, Cl. 427-358.000.
Shaw Plastics Corporation: *See*—
O'Brien, John C.; and Ehrenfreund, Herbert A., 4,091,136, Cl. 428-141.000.
Shell Oil Company: *See*—
Carr, John B.; and Durham, Harry G., 4,091,221, Cl. 544-147.000.
Clayfield, Eric J.; Lumb, Ernest C.; and Wilbraham, Kenneth J., 4,090,853, Cl. 44-51.000.
Gergen, William P.; and Davison, Sol, 4,090,996, Cl. 260-40.00R.
Lybarger, James H.; Richardson, Edwin A.; Scheuerman, Ronald F.; and Templeton, Charles C., 4,090,563, Cl. 166-307.000.
Pilgram, Kurt H. G., 4,090,861, Cl. 71-90.000.
Winkler, Hans J. S., 4,091,073, Cl. 423-226.000.
Shibata, Minoru: *See*—
Nishimura, Hiromi; Ono, Kenji; and Shibata, Minoru, 4,091,346, Cl. 335-78.000.
Shibata, Mituhiko: *See*—
Itoh, Yukinori; Shibata, Mituhiko; Masuda, Akira; Ohtake, Yasuo; and Etoh, Motoaki, 4,090,484, Cl. 123-127.000.
Shields, James R., Jr. Animated game. 4,090,712, Cl. 273-85.00R.
Shimada, Kiyohiro: *See*—
Mutai, Masahiko; Mada, Mitsuo; Nakajima, Kei; Takahashi, Shusei; Nakao, Takashi; Shimada, Kiyohiro; and Iijima, Takashi, 4,091,117, Cl. 426-43.000.
Shimizu, Masahiko: *See*—
Shinoda, Akibumi; and Shimizu, Masahiko, 4,090,578, Cl. 180-52.000.
Shimizu, Tutomu: *See*—
Minato, Akira; Shimizu, Tutomu; and Kanekiyo, Yosio, 4,090,813, Cl. 416-184.000.
Shimoi, Akio, to Kabushiki Kaisha Suwa Seikosha. Digital display driving circuit. 4,091,377, Cl. 340-336.000.
Shin-Etsu Chemical Co., Ltd.: *See*—
Onda, Yoshiro; Muto, Hiroaki; and Suzuki, Hiroshi, 4,091,205, Cl. 536-85.000.
Shin-Shirasuna Electric Corp.: *See*—
Hayashi, Kiyoshi, 4,090,679, Cl. 242-186.000.
Shinoda, Akibumi; and Shimizu, Masahiko, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Battery operated fork-lift trucks. 4,090,578, Cl. 180-52.000.
Shinohara, Toshio: *See*—
Sawamura, Ichiro; Sogi, Shinroku; Kamachi, Shin-ichi; Yoshinaga, Makoto; Goto, Atsuo; Izawa, Masao; Nakajima, Yoshio; Gocho, Nagahiro; Shinohara, Toshio; and Hattori, Shin-ichiro, 4,090,921, Cl. 195-127.000.
Shinshu Seiki Kabushiki Kaisha: *See*—
Nakamura, Osamu, 4,090,410, Cl. 74-414.000.
Shishido, Jiro: *See*—
Matsumoto, Shiro; Shishido, Jiro; and Fukumoto, Toshitsugu, 4,090,430, Cl. 92-71.000.
Shuler, Cobia B.; and Moore, Wesley E., Jr., to Salisbury, T. W., III; and Ellis, Gayle F. Water level measurement device. 4,090,407, Cl. 73-290.00V.
Shuster, Edward J.: *See*—
Schreiber, William L.; Siano, James N.; Vock, Manfred Hugo; and Shuster, Edward J., 4,090,985, Cl. 252-522.000.
Siano, James N.: *See*—
Schreiber, William L.; Siano, James N.; Vock, Manfred Hugo; and Shuster, Edward J., 4,090,985, Cl. 252-522.000.
Sibley, Henry C., to General Signal Corporation. Fail-safe monitor of d.c. voltage. 4,091,292, Cl. 307-130.000.
Siddiqi, Iqbal; Suva, Tito; and Roehrich, Christian, to Battelle Memorial Institute. Device for cyclically repeating a series of colorimetric analysis on each of a succession of samples. 4,090,791, Cl. 356-184.000.

Siegel, Philip. Camera support bracket and flash unit mounting device. 4,091,402, Cl. 354-293.000.

Siegel, Steve L.; and Schwarzbach, Richard J., to Pittway Corporation. Self-contained fire detector with interconnection circuitry. 4,091,363, Cl. 340-227.00R.

Siemens Aktiengesellschaft: *See—*
Hoffmann, Kurt, 4,091,378, Cl. 340-347.0AD.
Hohne, Karl, 4,091,175, Cl. 429-40.000.
Lange, Gerhard; and Peche, Gerhard, 4,091,436, Cl. 361-120.000.
Muller, Karl-Heinz; Schliepe, Reinhard; and Rindfleisch, Volker, 4,091,374, Cl. 340-324.0AD.
Ohleyer, Bernd, 4,090,409, Cl. 74-128.000.
Rossler, Bernward, 4,091,359, Cl. 340-166.00R.

Sig Schweizerische Industrie-Gesellschaft: *See—*
Luginbuhl, Pierre, 4,090,610, Cl. 209-74.00R.

Sigmond, Gyorgy: *See—*
Boros, Jozsef; Ferenczi, Tibor; Horvath, Gyula; Lazar, Ferenc; Lengyel, Laszlo; Matyasi, Jozsef; Orban nee Kelemen, Maria; Pinter, Tihamer; Sigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Bela; Voros, Istvan; Wentzely, Kalman; Zambo, Janos; and Zoldi, Jozsef, 4,091,071, Cl. 423-121.000.

Sigri Elektrographit GmbH: *See—*
Hirschvogel, Alfred; and Wagner, Friedrich, 4,091,083, Cl. 423-415.00R.

Siiberg, Hemming, to Wagner Electric Corporation. Electro-mechanical liquid level sensor. 4,091,250, Cl. 200-84.00C.

Siklosi, Peter: *See—*
Boros, Jozsef; Ferenczi, Tibor; Horvath, Gyula; Lazar, Ferenc; Lengyel, Laszlo; Matyasi, Jozsef; Orban nee Kelemen, Maria; Pinter, Tihamer; Sigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Bela; Voros, Istvan; Wentzely, Kalman; Zambo, Janos; and Zoldi, Jozsef, 4,091,071, Cl. 423-121.000.

Silverbush, Herbert M., to Rau Fasteners, a division of U.S. Industries, Inc. Snap fastener attaching system. 4,090,652, Cl. 227-18.000.

Simanskis, Imantas; and Caldwell, Richard K., to Vapor Corporation. Packing assembly. 4,090,719, Cl. 277-125.000.

Simco, Inc.: *See—*
Mason, Stanley I., Jr.; and Pfeifer, John E., 4,091,371, Cl. 340-274.00R.

Simmons Fastener Corporation: *See—*
Busch, Kieran; and Hoen, Cuyler, 4,090,727, Cl. 292-11.000.

Simmons, James Almy; Wood, George Edson; and Jacquemin, Paul Leroy, to O. M. Scott & Sons Company. Process for the selective control of tall fescue in turf. 4,090,866, Cl. 71-108.000.

Simmons, James E. Forced air furnace with liquid heat exchanger. 4,090,492, Cl. 126-101.000.

Simmons, William A., Jr.: *See—*
Aldrich, Ralph E.; Cumming, William J.; and Simmons, William A., Jr., 4,090,975, Cl. 252-299.000.

Simon Container Machinery Limited: *See—*
Jardine, Robert William; and Johnson, Frederick Paul, 4,090,433, Cl. 93-58.20R.

Simonek, Ildiko: *See—*
Benko, Pal; Simonek, Ildiko; Pallos, Laszlo; Kovacs, Jeno; and Magyar, Karoly, 4,091,206, Cl. 542-416.000.

Simonsen, Knud: *See—*
Jorgensen, Olaf V.; and Simonsen, Knud, 4,090,275, Cl. 17-24.000.

Sinclair Company, The: *See—*
Minick, David G., 4,090,897, Cl. 156-73.100.

Sinclair, Stuart W., to Anderson, Clayton & Co. Forklift clamps. 4,090,628, Cl. 214-655.000.

Singh, Ajaib; and Kaizerman, Samuel, to American Cyanamid Company. Process for preparing polyformals in the presence of an organic epoxide. 4,090,990, Cl. 260-18.0PF.

Sipos, Tibor, to Johnson & Johnson. Potentiated anesthetics. 4,091,090, Cl. 424-45.000.

Skolnik, Marvin Benjamin: *See—*
Poley, Neil Myron; and Skolnik, Marvin Benjamin, 4,091,305, Cl. 313-220.000.

Skwirut, Paul T. Connecting link for fishing tackle. 4,090,317, Cl. 43-42.360.

Slope Indicator Co.: *See—*
Hancock, George A.; and McCutcheon, Hugh W., 4,090,397, Cl. 73-73.000.

Slusarchyk, William A.; and Cimarusti, Christopher M., to E. R. Squibb & Sons, Inc. 4-Thio substituted-Δ^2cephalosporin intermediates. 4,091,216, Cl. 544-30.000.

Slywka, Michael, to Gibson-Homans Company, The. Mixer for viscous materials. 4,091,457, Cl. 366-304.000.

Smillie, John G., to Aurora Metal Corporation. Process for hot resin coating of shell sands using salicylic acid. 4,090,995, Cl. 260-38.000.

Smirnov, Gennady Konstantinovich: *See—*
Vitchenko, Vladimir Stepanovich; Smirnov, Gennady Konstantinovich; and Shalaev, Vladimir Grigorievich, 4,091,299, Cl. 310-71.000.

Smith, Dale A.; and Barton, Cyril. Tree cutting apparatus. 4,090,540, Cl. 144-34.00R.

Smith, Daniel P.: *See—*
Darrow, Kenneth A.; and Smith, Daniel P., 4,091,146, Cl. 428-594.000.

Smith, Eugene Leroy, Jr.: *See—*
Wang, Samuel Shan-Ning; and Smith, Eugene Leroy, Jr., 4,090,972, Cl. 252-61.000.

Smith, Floyd O., to ESCO Corporation. Connecting link. 4,090,357, Cl. 59-85.000.

Smith, Isaac L.; and Glassbrook, Clarence I., to Ethyl Corporation. Automatic gas analyzer system. 4,090,392, Cl. 73-421.50R.

Smith, Jonathan; Larko, Robert C.; and Booth, Eugene E., to Sunbeam Equipment Corporation. Rotary retort furnace. 4,090,622, Cl. 214-18.00K.

Smith Kline Instruments, Inc.: *See—*
Barrett, M. James; and De Graw, Joseph I., 4,091,087, Cl. 424-1.000.

Smith, Maurice L.; and Smith, Robert M., to United States of America, Energy. Process for recovering filler from polymer. 4,091,077, Cl. 423-298.000.

Smith & McLaurin Limited: *See—*
Henderson, Neil Kirkpatrick; and Thomson, Eric, 4,091,162, Cl. 428-327.000.

Smith, Normand Coy; and Wilson, Joseph Townsend, III, to International Business Machines Corporation. Arrangement for multi-orifice ink jet print head. 4,091,390, Cl. 346-75.000.

Smith, Ray F.: *See—*
Smith, Ray V.; Smith, Ray F.; Brizendine, Wesley D.; and Boatman, Robert L., 4,090,640, Cl. 222-52.000.

Smith, Ray V.; Smith, Ray F.; Brizendine, Wesley D.; and Boatman, Robert L. Hot melt adhesive pumping apparatus having pressure-sensitive feedback control. 4,090,640, Cl. 222-52.000.

Smith, Richard E.; Hamlin, Thomas J.; Stange, Klaus K.; and Cassano, James R., to Xerox Corporation. Registration station. 4,090,704, Cl. 271-246.000.

Smith, Richard L.; Farrar, Ralph C.; and Willis, Daniel H., to Phillips Petroleum Company. Suppressing gel in the continuous solution polymerization of a conjugated diene with a monovinyl aromatic compound. 4,091,198, Cl. 526-178.000.

Smith, Richard L.: *See—*
Martin, Luther W.; and Smith, Richard L., 4,090,534, Cl. 138-97.000.

Smith, Robert H., to Atlantic Richfield Company. Denitrogenation of syncrude. 4,090,951, Cl. 208-91.000.

Smith, Robert M.: *See—*
Smith, Maurice L.; and Smith, Robert M., 4,091,077, Cl. 423-298.000.

Smith, Ronald E. Vital emergency survival time (vest). 4,090,509, Cl. 128-142.500.

Smith, Wesley E.; and Napier, Bradley, Jr., to United States of America, Energy. Method for reproducibly preparing a low-melting high-carbon yield precursor. 4,091,196, Cl. 526-73.000.

Smith, William Edward, to General Electric Company. Preparation of 1,4-diols by hydrolysis-hydrogenation of 2-alkoxytetrahydrofurans. 4,091,041, Cl. 568-865.000.

SmithKline Corporation: *See—*
Campbell, James A.; and Unangst, R. Richard, 4,090,639, Cl. 222-43.000.
Hoover, John Russel Eugene; and Weisbach, Jerry Arnold, 4,091,227, Cl. 560-9.000.

Snamprogetti, S.p.A.: *See—*
Zappelli, Piergiorgio; Rossodivita, Antonio; Pappa, Rosario; and Re, Luciano, 4,091,203, Cl. 536-26.000.

Snyder, Robert B.: *See—*
Vogel, Gerhard John; Jonke, Albert A.; and Snyder, Robert B., 4,091,076, Cl. 423-244.000.

Sobarzo, Omar: *See—*
Pollock, Douglas; Sobarzo, Omar; Urquizar, Rolando; Vilches, Carlos; and Bolanos, Jaime, 4,090,870, Cl. 75-74.000.

S.A. Ermeto: *See—*
Dubreuil, Serge, 4,090,387, Cl. 72-217.000.

Societe Ciuile Particuliere Cominda Engineering: *See—*
Mallet, Gilbert, 4,090,496, Cl. 126-271.000.

Societe d'Assistance Technique Pour Produits Nestle S.A.: *See—*
Bosund, Sven Ingmar Walton; Bengtsson, Bengt Lennart; and Ostman, Karl Bertil Lennart, 4,091,003, Cl. 260-112.00R.
de Rham, Olivier, 4,091,118, Cl. 426-46.000.

Societe de Traction Cem - Oerlikon: *See—*
Nguyen, Phi Duy, 4,091,319, Cl. 320-9.000.

Societe d'Etudes de Machines Thermiques: *See—*
Bastenhof, Dirk, 4,090,819, Cl. 417-499.000.

Societe Internationale d'Investissements et de Participations par abreviation Interpar: *See—*
Noyon, Gustave Maurice, 4,090,623, Cl. 214-38.00D.

Societe Intersub Developpement: *See—*
Stankoff, Alain, 4,091,322, Cl. 324-3.000.

Societe Miniere et Metallurgique de Penarroya: *See—*
Lebleu, Albert; Fossi, Paul; and Demarthe, Jean-Michel, 4,090,871, Cl. 75-84.500.

Societe pour l'Affranchissement et le Timbrage Automatoques S.A.: *See—*
Jarleton, Paul; and Tollet, Marcel, 4,091,268, Cl. 235-424.000.

Soder, Alfons; and Perrey, Klaus, to Hoechst Aktiengesellschaft. Phosphinyl compounds. 4,091,095, Cl. 424-211.000.

Soderberg, Gunnar. Anchoring means. 4,090,463, Cl. 114-294.000.

Sogi, Shinroku: *See—*
Sawamura, Ichiro; Sogi, Shinroku; Kamachi, Shin-ichi; Yoshinaga, Makoto; Goto, Atsuo; Izawa, Masao; Nakajima, Yoshio; Gocho, Nagahiro; Shinohara, Toshio; and Hattori, Shin-ichiro, 4,090,921, Cl. 195-127.000.

Solvay & Cie: *See—*
Nicolas, Edgard; and Bourgeois, Louis, 4,090,939, Cl. 204-258.000.

Solymar, Karoly: *See—*
Boros, Jozsef; Ferenczi, Tibor; Horvath, Gyula; Lazar, Ferenc; Lengyel, Laszlo; Matyasi, Jozsef; Orban nee Kelemen, Maria;

Pinter, Tihamer; Sigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Bela; Voros, Istvan; Wentzely, Kalman; Zambo, Janos; and Zoldi, Jozsef, 4,091,071, Cl. 423-121.000.

Sommer, Gerald, to International Shoe Machine Corporation. Roughing machine having rockable shoe assembly support. 4,090,378, Cl. 69-6.500.

Sony Corporation: *See—*
Kawamata, Katsuyoshi, 4,091,168, Cl. 428-416.000.
Saito, Etsuro; and Takahashi, Katsumasa, 4,091,428, Cl. 360-104.000.
Sanada, Seiji; and Isono, Katsuo, 4,091,411, Cl. 358-28.000.
Suzuki, Tadao; and Wachi, Shigeaki, 4,091,434, Cl. 361-100.000.

Soodak, Charles: *See—*
Macemon, James H.; and Soodak, Charles, 4,090,789, Cl. 356-85.000.

Soroka, Walter. Free play apparatus for coin operated amusement devices. 4,091,437, Cl. 361-166.000.

Sotolongo, Thomas J., to Thomas & Betts Corporation. Adjustable floor receptacle. 4,091,231, Cl. 174-48.000.

Souriau & Cie: *See—*
Dupont, Jean-Pierre; Gregoire, Jean-Francois; Ligier, Michel; and Roy, Jacques, 4,090,404, Cl. 73-119.00A.

Sousa, Anthony A.: *See—*
Durden, John A., Jr.; Sousa, Anthony A.; and Stephen, John F., 4,091,006, Cl. 260-410.500.

Souter, Rex W., to Eli Lilly and Company. N-pentafluoropropionyl and n-heptafluorobutyryl proline. 4,091,029, Cl. 260-326.200.

South African Inventions Development Corp.: *See—*
Turpie, Derek William Fraser; and Klazar, Jaroslav, 4,090,277, Cl. 19-115.00R.

Southern Illinois University Foundation: *See—*
Borst, Walter L.; Miller, Stephen K.; and Kane, Michael B., 4,090,494, Cl. 126-270.000.

Souville, Pierre; and Baudouin, Jean-Pierre, to Compagnie Deutsch. Connector with remote control locking system. 4,090,761, Cl. 339-90.00R.

Spector, George: *See—*
Bishopp, John H.; and Spector, George, 4,090,464, Cl. 116-63.00R.
Donley, Virgil L.; and Spector, George, 4,090,522, Cl. 132-112.000.

Speidel, Blasius. Sphygmomanometer measuring capillary with mercury shut-off device. 4,090,503, Cl. 128-2.05G.

Spencer, Dudley W. C. Horseshoe mounting appliance and method. 4,090,566, Cl. 168-17.000.

Sperry Rand Corporation: *See—*
Dohogne, James R.; and Sabnis, Ajit V., 4,090,745, Cl. 308-10.000.
Ehresman, Virgil Alphonse; and McIntyre, George W., 4,091,456, Cl. 364-900.000.

Spintex, Inc.: *See—*
DeVittorio, Joseph M., 4,090,348, Cl. 57-105.000.

Sprague Electric Company: *See—*
Thompson, David Gale; and Ogilvie, John Taylor, 4,090,288, Cl. 29-570.000.

Sprecher & Schuh AG: *See—*
Amsler, Joachim, 4,091,251, Cl. 200-146.0AA.

Srivastava, Gopal K.: *See—*
Rhee, Dennis W.; and Srivastava, Gopal K., 4,091,419, Cl. 358-168.000.

Sta-Rite Industries, Inc.: *See—*
Grout, Edward C., 4,090,963, Cl. 210-130.000.

Stadler, Paul: *See—*
Fehr, Theodor; and Stadler, Paul, 4,091,099, Cl. 424-250.000.

Stamicarbon, B.V.: *See—*
Alfenaar, Marinus, 4,091,176, Cl. 429-40.000.

Standard Oil Company, The: *See—*
Dirks, Gary W.; Li, George S.; and Jones, John F., 4,090,998, Cl. 260-63.00R.
Li, George S.; and Dirks, Gary W., 4,091,199, Cl. 526-280.000.

Standard Products Company, The: *See—*
Zoller, Robert A., 4,090,906, Cl. 156-244.270.

Stange, Klaus K.: *See—*
Smith, Richard E.; Hamlin, Thomas J.; Stange, Klaus K.; and Cassano, James R., 4,090,704, Cl. 271-246.000.

Stankoff, Alain, to Societe Intersub Developpement. Eddy current generating type metal pipeline detector. 4,091,322, Cl. 324-3.000.

Stanton, Horace D.: *See—*
Reed, Russell; and Stanton, Horace D., 4,090,894, Cl. 149-19.910.

Stauffer Chemical Company: *See—*
Baker, Don R., 4,090,865, Cl. 71-118.000.
Gutman, Arnold D., 4,090,864, Cl. 71-98.000.

Stav, Praha, vyrobni stavebni druzstvo stredisko Monta: *See—*
Rybar, Vaclav; Drapal, Radovan; and Kabelik, Radim, 4,090,476, Cl. 122-367.0PF.

Ste Fiat France S.A.: *See—*
Perin, Philippe, 4,090,725, Cl. 280-479.00A.

Stead, Cecil Vivian: *See—*
Andrew, Herbert Francis; Ramsay, David William Crichton; and Stead, Cecil Vivian, 4,091,021, Cl. 260-191.000.

Stearns, Joseph E., to Dayco Corporation. Printing blanket holding bar. 4,090,444, Cl. 101-415.100.

Stedman, Robert N., to Caterpillar Tractor Co. Industrial truck having a pivotal hood and counterweight assembly. 4,090,579, Cl. 180-69.00R.

Steelastic Company, The: *See—*
Bronson, Wright, Jr.; Ashworth, Thomas, Jr.; Kiemer, Ralph Frederick; and Hausch, Gail William, 4,090,835, Cl. 425-505.000.

Steffey, Eddie B.: *See—*
Christie, Christopher E.; and Steffey, Eddie B., 4,090,909, Cl. 156-414.000.

Steinberger, Rolf: *See—*
Sander, Bruno; Scherling, Kurt; Steinberger, Rolf; and Ropte, Eckhard, 4,091,058, Cl. 264-11.000.

Stengel, Jurgen: *See—*
Hestermann, Klaus; Stengel, Jurgen; Heymer, Gero; and May, Christian, 4,091,078, Cl. 423-299.000.

Stephen, John F.: *See—*
Durden, John A., Jr.; Sousa, Anthony A.; and Stephen, John F., 4,091,006, Cl. 260-410.500.

Stephens, Thomas W. Sample-and-hold circuit. 4,091,297, Cl. 307-353.000.

Stewart, Arthur A. Axially supported boring tool and method for making same. 4,090,807, Cl. 408-213.000.

Stewart, William J.: *See—*
Olding, Michael J.; Fortman, Ronald F.; and Stewart, William J., 4,091,438, Cl. 361-189.000.

Stillman, Donald W.: *See—*
Bagheri, Mansour A. H.; and Stillman, Donald W., 4,090,544, Cl. 151-14.00R.

Stobbe, Richard E.: *See—*
Zankl, Frank; Kirkham, Edward E.; Stobbe, Richard E.; and Schachte, John J., 4,091,294, Cl. 318-227.000.

Stoev, Stoycho Mitrev; Vuchev, Yordan Vladimirov; Kuzev, Lyubomir Vladimirov; and Atznov, Georgi Petrov, to Vish Minno-Geoloshki Institute. Electrophoretic technique for varying the concentration of a colloidal solution. 4,090,937, Cl. 204-180.00R.

Stoltman, Stephen, Jr.; and Tepper, Charles W., to United States of America, Navy. Method for synchronizing point detonating arming with controlled variable time detonating arming in military fuzes. 4,090,449, Cl. 102-70.20P.

Stone, Kirby Lee; and Borisch, Donald James, to Cincinnati Milacron Inc. Liquid feeding control method. 4,090,695, Cl. 366-76.000.

Story, J. Albert, Jr., to Cla-Val Co. Timer controlled valve. 4,090,532, Cl. 137-624.150.

Straitz, John F., III, to Combustion Unlimited Incorporated. Multi-pilot gas conservation system for flare burners. 4,090,840, Cl. 431-14.000.

Straube, Peter Jon, to Gulf & Western Manufacturing Company. Feeding apparatus for sheet material. 4,090,703, Cl. 271-233.000.

Streeper, Richard D., to Minnesota Mining and Manufacturing Company. Photosensitive imageable composition containing a hexaaromaticbimidazole, a leuco dye and an oxygen-sensitizing compound. 4,090,877, Cl. 96-27.00E.

Strike, Donald P., to American Home Products Corporation. 15-Substituted prostanoic acids. 4,091,015, Cl. 260-520.00B.

Strobel, Felix: *See—*
Kunz, Peter; and Strobel, Felix, 4,090,575, Cl. 177-210.0EM.

Strom, Richard Albert, to Control Data Corporation. Plasma display drive circuit. 4,091,309, Cl. 315-169.0TV.

Strombeck, Per: *See—*
Johansson, Anders; and Strombeck, Per, 4,090,620, Cl. 214-16.00B.

Struve, Friedrich, to Gundle Plastics (Proprietary) Limited. Apparatus for welding heat fusible material. 4,091,254, Cl. 219-79.000.

Stuck, Robert M., to Aero-Dyne Manufacturing, Inc. Method and apparatus for signalling concentration of air conveyed ionizable foreign matter. 4,090,308, Cl. 34-32.000.

Studer, John Eugene, Jr., to Fisher Scientific Company. Disposable antibiotic susceptability test package. 4,090,920, Cl. 195-127.000.

Stumpp, Gerhard; and Grieshaber, Hermann, to Robert Bosch GmbH. Fuel injection system. 4,090,486, Cl. 123-139.0AW.

Stumpp, Gerhard; and Grieshaber, Hermann, to Robert Bosch GmbH. Fuel injection system. 4,090,487, Cl. 123-140.0MP.

Sugai, Tatsuhiko: *See—*
Iwaoka, Masao; Igeta, Yosuke; Kiku, Toyochika; Kobayashi, Fumio; and Sugai, Tatsuhiko, 4,091,427, Cl. 360-101.000.

Sugimoto, Hiroshi; and Nishikawa, Kazuyoshi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Device for lubricating rear bush in extension housing of automotive transmission. 4,090,748, Cl. 308-121.000.

Sugimoto, Takashi; and Noyori, Kazumasa, to Tokyo Shibaura Electric Co., Ltd. Oscillator. 4,091,339, Cl. 331-117.00R.

Sumitomo Bakelite Company Limited: *See—*
Takagi, Toshinori; Nishiyama, Tatsuichiro; and Uchida, Unosuke, 4,091,138, Cl. 428-209.000.

Sumitomo Chemical Company Limited: *See—*
Kojima, Shinichi; Nakamura, Kazuro; Koide, Ten; and Ogino, Shigeo, 4,091,093, Cl. 424-177.000.
Ohno, Nobuo; Ohno, Isao; Nishioka, Toshio; Takeda, Hisami; and Kasamatsu, Kiyoshi, 4,091,111, Cl. 424-308.000.

Sun, Kuan-Han, to Westinghouse Electric Corp. Extremely sensitive metallic vapor detection. 4,091,283, Cl. 250-303.000.

Sun Petroleum Products Company: *See—*
Reynolds, Ronald W., 4,090,950, Cl. 208-89.000.

Sunakawa, Makoto: *See—*
Hori, Yutaka; Takahashi, Hidekazu; Sunakawa, Makoto; Ijichi, Ichiro; and Kamei, Kiyohiro, 4,091,157, Cl. 428-196.000.

Sunbeam Corporation: *See—*
Roszyk, Leon M.; Mammen, H. William; and Buchner, John B., 4,091,317, Cl. 318-369.000.

Sunbeam Equipment Corporation: *See—*
Smith, Jonathan; Larko, Robert C.; and Booth, Eugene E., 4,090,622, Cl. 214-18.00K.

Sunouchi, Akio: *See—*
Kozuki, Susumu; Sunouchi, Akio; and Watanabe, Yoshiaki, 4,091,395, Cl. 354-173.000.

Suntech, Inc.: *See—*
Lyons, James Edward, 4,090,885, Cl. 106-170.000.
Norton, Richard V., 4,091,010, Cl. 260-465.00D.
Scheibel, Edward, 4,091,039, Cl. 568-858.000.
Sutherland, Ray, to Rockwell International Corporation. Backflow preventer and relief valve assembly. 4,090,527, Cl. 137-215.000.
Sutter, Hanspeter: *See—*
Ferri, Johann Walter; and Sutter, Hanspeter, 4,090,857, Cl. 55-337.000.
Suttles, James Marshall: *See—*
Brown, Asa V., Jr.; and Suttles, James Marshall, 4,090,315, Cl. 40-518.000.
Suva, Tito: *See—*
Siddiqi, Iqbal; Suva, Tito; and Roehrich, Christian, 4,090,791, Cl. 356-184.000.
Suzuki, Fujio: *See—*
Kidoh, Kunizoh; Kudo, Yoshio; and Suzuki, Fujio, 4,091,055, Cl. 260-900.000.
Suzuki, Hiroshi; Tsujiuchi, Toshio; and Goto, Masanobu, to Toyoda-Koki Kabushiki-Kaisha. Fluid bearing including both hydrodynamic and hydrostatic bearings. 4,090,743, Cl. 308-9.000.
Suzuki, Hiroshi; Sawanishi, Shigeru; and Kusunose, Takamaro, to Japan Exlan Company Limited. Process for producing flame retardant acrylic fibers with improved properties. 4,091,066, Cl. 264-182.000.
Suzuki, Hiroshi: *See—*
Onda, Yoshiro; Muto, Hiroaki; and Suzuki, Hiroshi, 4,091,205, Cl. 536-85.000.
Suzuki, Osamu: *See—*
Kasuga, Akira; Akashi, Goro; and Suzuki, Osamu, 4,091,158, Cl. 428-216.000.
Suzuki, Tadao; and Wachi, Shigeaki, to Sony Corporation. Surge current protection circuit. 4,091,434, Cl. 361-100.000.
Suzuki, Yasoji; Tokumaru, Yukuya; and Nakai, Masanori, to Tokyo Shibaura Electric Co., Ltd. Semiconductor R-S flip-flop circuit. 4,091,296, Cl. 307-292.000.
Suzuki, Yoshikatsu: *See—*
Honda, Toshio; Tanaka, Shoji; Iwami, Koichi; Fukuura, Yukio; Tanuma, Itsuo; Suzuki, Yoshikatsu; and Akiyoshi, Hiromi, 4,090,546, Cl. 152-347.000.
Svensson, Lars-Erik: *See—*
Tengzelius, Jan Robert; Lindskog, Per Folke; and Svensson, Lars-Erik, 4,090,868, Cl. 75-0.50R.
Sverdrup, Edward F.: *See—*
Petlevich, Walter J.; and Sverdrup, Edward F., 4,091,385, Cl. 343-8.000.
Swanda, Franklin J. Fluid control for electrical circuit. 4,091,370, Cl. 340-272.000.
Switzgable, Harold, to Alpha Systems Corporation. Apparatus for producing methane gas by processing waste materials. 4,090,940, Cl. 204-278.000.
Szabo, Joseph F., to ESB Incorporated. Vent system with flame arresting capability. 4,091,179, Cl. 429-84.000.
Szabo, Joseph F.: *See—*
Fox, Albert L.; Leeson, Jeffrey S.; and Szabo, Joseph F., 4,091,180, Cl. 429-84.000.
Szakacs, Bela; and Scrattish, Frank. Lead acid battery grid casting system installation and technique. 4,090,550, Cl. 164-70.000.
Szekely, Laszlo: *See—*
Turbier, Paul; and Szekely, Laszlo, 4,091,061, Cl. 264-40.500.
Szekeres, John M., to Medina Plastic Products, Inc. Flexible form for cementitious slurry. 4,090,337, Cl. 52-309.100.
Tabuchi, Katsumi: *See—*
Nakajima, Masaya; and Tabuchi, Katsumi, 4,091,357, Cl. 340-5.00R.
Tadanier, John Soloman; Martin, Jerry Roy; and Kurath, Paul, to Abbott Laboratories. 4-N-acylfortimicin B derivatives and the chemical conversion of fortimicin B to fortimicin A. 4,091,032, Cl. 260-345.80R.
Tadataka, Chiba; and Masakazu, Kurashige. Piezoelectric quartz vibrator with heating electrode means. 4,091,303, Cl. 310-343.000.
Tagaya, Kiyoshi: *See—*
Kosugi, Jyuniti; Kudo, Yoshihiko; and Tagaya, Kiyoshi, 4,091,080, Cl. 423-555.000.
Tajika, Akeo, to Medical Institute of Hoshokai. Remote-controlled barium injection apparatus. 4,090,502, Cl. 128-2.00A.
Tajima, Eiichi; Yamamoto, Kaname; and Imai, Takayoshi, to Tajima Roofing Co., Ltd. Laminated bituminous roofing membrane. 4,091,135, Cl. 428-40.000.
Tajima Roofing Co., Ltd.: *See—*
Tajima, Eiichi; Yamamoto, Kaname; and Imai, Takayoshi, 4,091,135, Cl. 428-40.000.
Takagi, Toshinori; Nishiyama, Tatsuichiro; and Uchida, Unosuke, to Sumitomo Bakelite Company Limited; and Takagi, Toshinori. Insulating film, sheet, or plate material with metallic coating and method for manufacturing same. 4,091,138, Cl. 428-209.000.
Takahashi, Asao: *See—*
Kawamoto, Tamio; Takahashi, Asao; and Toyota, Hiroshi, 4,091,348, Cl. 251-129.000.
Takahashi, Hidekazu: *See—*
Hori, Yutaka; Takahashi, Hidekazu; Sunakawa, Makoto; Ijichi, Ichiro; and Kamei, Kiyohiro, 4,091,157, Cl. 428-196.000.
Takahashi, Katsumasa: *See—*
Saito, Etsuro; and Takahashi, Katsumasa, 4,091,428, Cl. 360-104.000.
Takahashi, Kiyoshi: *See—*
Kakinuma, Mitsuo; Motegi, Isoji; Matsui, Yasuo; Matsui, Masatake; Ohtsuju, Masaaki; Takahashi, Kiyoshi; and Fukuda, Takeo, 4,091,064, Cl. 264-174.000.
Takahashi, Koichi; Hitomi, Nobuteru; Kizu, Taisuke; Honchi, Hirotugu; and Arita, Kazuo, to Nissan Motor Company, Ltd. Constant velocity universal joint. 4,090,375, Cl. 64-21.000.
Takahashi, Norihiko: *See—*
Fukuda, Minolu, 4,090,658, Cl. 229-2.5EC.
Takahashi, Shiro, to Man Design Co., Ltd. Electromagnetic fluid operating apparatus. 4,090,816, Cl. 417-371.000.
Takahashi, Shusei: *See—*
Mutai, Masahiko; Mada, Mitsuo; Nakajima, Kei; Takahashi, Shusei; Nakao, Takashi; Shimada, Kiyohiro; and Iijima, Takashi, 4,091,117, Cl. 426-43.000.
Takamatsu, Akira: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Takamatsu, Akira; and Kayahara, Kenji, 4,091,097, Cl. 424-230.000.
Takamura, Masayuki; Matsuo, Aritsune; and Iijima, Kenzaburo, to Nippon Gakki Seizo Kabushiki Kaisha. Process for producing clad metals. 4,090,873, Cl. 75-208.00R.
Takara Co., Ltd.: *See—*
Ogawa, Iwakichi, 4,090,321, Cl. 46-12.000.
Takase, Tsuneo, to Tokyo Shibaura Electric Co., Ltd. Electronic music box circuit. 4,090,349, Cl. 58-12.000.
Takeda Chemical Industries, Ltd.: *See—*
Ishiguro, Toshihiro; and Sanno, Yasushi, 4,091,220, Cl. 544-121.000.
Takeda, Hisami: *See—*
Ohno, Nobuo; Ohno, Isao; Nishioka, Toshio; Takeda, Hisami; and Kasamatsu, Kiyoshi, 4,091,111, Cl. 424-308.000.
Takenaga, Mutsuo: *See—*
Ohta, Takeo; Takenaga, Mutsuo; Akahira, Nobuo; Yamada, Noboru; and Yamashita, Tadaoki, 4,091,171, Cl. 428-539.000.
Takenaka, Nagatoki. Medical appliance. 4,090,517, Cl. 128-303.100.
Takeuchi, Tomio: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Takamatsu, Akira; and Kayahara, Kenji, 4,091,097, Cl. 424-230.000.
Tanabe Seiyaku Co., Ltd.: *See—*
Chibata, Ichiro; Tosa, Tetsuya; Mori, Takao; Watanabe, Taizo; Sano, Ryujiro; and Matuo, Yuhsi, 4,090,919, Cl. 195-63.000.
Tanaka, Koji: *See—*
Nagano, Mineo; Saitoh, Michio; Awazawa, Shigeru; and Tanaka, Koji, 4,090,994, Cl. 260-31.80R.
Tanaka, Masaru; and Matsumoto, Yoshimitsu, to Matsushita Electric Industrial Co., Ltd. Method for welding lead wires together. 4,091,259, Cl. 219-137.00R.
Tanaka, Shoji: *See—*
Honda, Toshio; Tanaka, Shoji; Iwami, Koichi; Fukuura, Yukio; Tanuma, Itsuo; Suzuki, Yoshikatsu; and Akiyoshi, Hiromi, 4,090,546, Cl. 152-347.000.
Tanaka, Toshiharu: *See—*
Ito, Shinichi; Tanaka, Toshiharu; and Wakabayashi, Noriaki, 4,091,266, Cl. 219-504.000.
Tandon, Jagdish C.: *See—*
Wu, Paul S.; and Tandon, Jagdish C., 4,091,379, Cl. 340-347.0AD.
Tanno, Kiyohiko: *See—*
Kozima, Yasuyuki; Tanno, Kiyohiko; and Ishi, Ichiro, 4,091,391, Cl. 346-76.00R.
Tanuma, Itsuo: *See—*
Honda, Toshio; Tanaka, Shoji; Iwami, Koichi; Fukuura, Yukio; Tanuma, Itsuo; Suzuki, Yoshikatsu; and Akiyoshi, Hiromi, 4,090,546, Cl. 152-347.000.
Tchon, Wallace Edward, to Honeywell Information Systems Inc. Time-independent circuit for multiplying and adding charge. 4,091,278, Cl. 307-221.00D.
Teass, Horace A., Jr.: *See—*
Diamond, Joseph M.; Kuzmik, Joseph T.; Teass, Horace A., Jr.; and McKernan, Patrick F., 4,091,324, Cl. 324-30.00B.
Technigaz: *See—*
Kotcharian, Michel, 4,090,538, Cl. 141-100.000.
Technological Enterprises Corp.: *See—*
Keane, James, 4,090,371, Cl. 62-129.000.
Teijin Seiki Company Limited: *See—*
Kamimura, Toshio, 4,090,429, Cl. 91-466.000.
Tejima, Iwao: *See—*
Aoki, Yukio; Wakita, Shizuo; Kato, Shoichi; Tejima, Iwao; and Ishida, Shuichi, 4,091,109, Cl. 424-304.000.
Teleglobe Pay-TV System, Inc.: *See—*
Nieson, Norman, 4,091,417, Cl. 358-117.000.
Teller, Sonia Ruth, to Endo Laboratories, Inc. Anti-depressant trans-hexahydropyrido[3,4-b]indoles. 4,091,102, Cl. 424-256.000.
Temple, Harold Edgar: *See—*
Berkman, Samuel; Kim, Kyong-Min; and Temple, Harold Edgar, 4,090,851, Cl. 23-273.0SP.
Templeton, Charles C.: *See—*
Lybarger, James H.; Richardson, Edwin A.; Scheuerman, Ronald F.; and Templeton, Charles C., 4,090,563, Cl. 166-307.000.
Templeton, Kenly & Company: *See—*
Ali, Syed Y.; and Profet, Anthony G., 4,090,453, Cl. 104-273.000.
Tengzelius, Jan Robert; Lindskog, Per Folke; and Svensson, Lars-Erik. Phosphorus steel powder and a method of manufacturing the same. 4,090,868, Cl. 75-0.50R.
Tenneco Chemicals, Inc.: *See—*
Walker, David G., 4,091,045, Cl. 260-677.00A.
Teodorescu, Constantin; Chiriac, Ilie; Sava, Cornel Doru; Draghici,

Adrian; and Zinca, Sabin, to Institutul National Pentru Creatie Stiintifica si Tehnica. Gas-lift device. 4,090,814, Cl. 417-178.000.

Tepper, Charles W.: *See—*
Stoltman, Stephen, Jr.; and Tepper, Charles W., 4,090,449, Cl. 102-70.20P.

Teraji, Tsutomu: *See—*
Kamiya, Takashi; Teraji, Tsutomu; Hashimoto, Masashi; Nakaguti, Osamu; and Oku, Teruo, 4,091,210, Cl. 544-18.000.

Terashima, Masaharu: *See—*
Tsukada, Tameyasu; and Terashima, Masaharu, 4,090,403, Cl. 73-104.000.

Ter-Minosian, Sergei Mikhailovich: *See—*
Golovanov, Nikolai Vasilievich; Ivanov, Vitaly Alexandrovich; Mitor, Vyacheslav Vladimirovich; Parshin, Anatoly Alexeevich; Sapozhnikov, Fedor Vasilievich; Ter-Minosian, Sergei Mikhailovich; and Chavchanidze, Evgeny Kirillovich, 4,090,473, Cl. 122-6.00A.

Termuo Corporation: *See—*
Togawa, Tatsuo, 4,090,513, Cl. 128-212.000.

Terrell Corporation, The: *See—*
Wilkinson, Everett R., Jr.; and Cooper, Henry E., IV, 4,090,643, Cl. 222-146.0HE.

Terrill, Paul Meredith, to Eli Lilly and Company. Stabilized nitroglycerin tablets. 4,091,091, Cl. 424-80.000.

Terry, Lynn E.; and Schoeppel, Roger J. Power cycles based upon cyclical hydriding and dehydriding of a material. 4,090,361, Cl. 60-649.000.

Teruyama, Hideo, to Kayabakogyokabushikikaisha. Gear pump with low pressure shaft lubrication. 4,090,820, Cl. 418-1.000.

Teti, John J., to Pyott-Boone Machinery Corporation. Scoop car. 4,090,627, Cl. 214-506.000.

Tetra Pak Developpement SA: *See—*
Rausing, Gad Anders, 4,090,343, Cl. 53-27.000.

Texaco Development Corporation: *See—*
Advani, Prem S., 4,091,218, Cl. 544-106.000.
Johnson, Fred L., Jr.; and Patterson, John A., 4,091,014, Cl. 260-512.00R.

Texas Instruments Incorporated: *See—*
Giolma, William Henry; and Andresen, Bernhard Hans, 4,091,335, Cl. 331-1.00A.
Grant, John L., 4,091,267, Cl. 219-544.000.

Textron Inc.: *See—*
Chaplin, John B., 4,090,459, Cl. 114-67.00A.
Moertel, George B., 4,090,832, Cl. 425-391.000.
Wasko, George, 4,090,279, Cl. 24-205.11F.

Th. Goldschmidt AG: *See—*
Koerner, Gotz; and Rossmy, Gerd, 4,090,987, Cl. 260-2.5AH.

Theodore, Ares N.: *See—*
Labana, Santokh S.; and Theodore, Ares N., 4,091,048, Cl. 260-836.000.

Therm-O-Disc Incorporated: *See—*
Deubel, Bernard S.; and Schmitt, Donald J., 4,091,354, Cl. 337-343.000.

Thermo-Seal, Inc.: *See—*
Shaffer, Myron W., 4,090,911, Cl. 156-499.000.

Theurer, Josef, to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H. Mobile track tamping machine that tamps three successive cribs. 4,090,451, Cl. 104-12.000.

Thiokol Corporation: *See—*
Outten, Edward, 4,090,895, Cl. 149-22.000.

Thirion, Philippe: *See—*
Kaser, Hans-Peter; Thirion, Philippe; and Ungerbock, Gottfried, 4,091,331, Cl. 329-110.000.

Thomas & Betts Corporation: *See—*
Sotolongo, Thomas J., 4,091,231, Cl. 174-48.000.

Thomas C. Wilson, Inc.: *See—*
Schott, Donald E., 4,090,382, Cl. 72-119.000.

Thomas, Rudolf; and Lurssen, Klaus, to Bayer Aktiengesellschaft. Novel phenoxycarboxylic acid aryloxy(thio)carbonylaminomethyl esters and their use for regulating plant growth. 4,090,862, Cl. 71-98.000.

Thompson, David Gale; and Ogilvie, John Taylor, to Sprague Electric Company. Solid electrolyte capacitor with metal loaded resin end caps. 4,090,288, Cl. 29-570.000.

Thompson, Johnnie W. Leg prosthesis. 4,090,264, Cl. 3-27.000.

Thompson, Paul D., to United States of America, Agriculture. Short milk tube of a milking machine. 4,090,471, Cl. 119-14.510.

Thompson, Richard M.: *See—*
Witt, Chester J.; and Thompson, Richard M., 4,090,526, Cl. 137-209.000.

Thomson-CSF: *See—*
Riethmuller, Jacques; and Vasseur, Jean Pierre, 4,091,416, Cl. 358-111.000.

Thomson, Eric: *See—*
Henderson, Neil Kirkpatrick; and Thomson, Eric, 4,091,162, Cl. 428-327.000.

Thornton, Raymond: *See—*
McConnell, Bobby Lee; Thornton, Raymond; and Graham, Louis Atkins, 4,091,004, Cl. 260-153.000.

Thrap, Guy Carlyle, to Valhalla Scientific Incorporated. Transconductance amplifier circuit. 4,091,333, Cl. 330-100.000.

Thrower, William F.: *See—*
Lee, Don H.; Weller, Kenneth P.; and Thrower, William F., 4,091,408, Cl. 357-56.000.

Tischler, Edward Joseph: *See—*
Bakken, Daniel Allen; Henderson, Robert Allen; and Tischler, Edward Joseph, 4,090,964, Cl. 210-134.000.

Tissot, Pierre L. Method for insuring soldered connections. 4,090,655, Cl. 228-103.000.

Tobe, Akihiro: *See—*
Kikumoto, Ryoji; Tobe, Akihiro; Tonomura, Shinji; and Ikoma, Hidenobu, 4,091,114, Cl. 424-330.000.

Tobias, James R.: *See—*
Bonne, Ulrich; and Tobias, James R., 4,090,663, Cl. 236-10.000.

Togawa, Tatsuo, to Termuo Corporation. Heat and moisture exchanging device for respiration. 4,090,513, Cl. 128-212.000.

Tokico Ltd.: *See—*
Karasudani, Yasuo; and Yazawa, Hiromi, 4,090,590, Cl. 188-72.500.

Tokiwa Leather Industrial Co., Ltd.: *See—*
Hirai, Junichiro, 4,091,154, Cl. 428-158.000.

Tokumaru, Yukuya: *See—*
Suzuki, Yasoji; Tokumaru, Yukuya; and Nakai, Masanori, 4,091,296, Cl. 307-292.000.

Tokuno, Masateru: *See—*
Okada, Toshio; Ohtsuki, Hideharu; Inagaki, Hiroshi; Hanyuda, Toshiaki; Tokuno, Masateru; and Igarashi, Seiichi, 4,091,167, Cl. 428-413.000.

Tokuyama Soda Kabushiki Kaisha: *See—*
Motani, Kensuke; Sata, Toshikatsu; and Nishimura, Masakatsu, 4,090,931, Cl. 204-98.000.

Tokyo Shibaura Electric Co., Ltd.: *See—*
Koinuma, Tokuju, 4,091,252, Cl. 219-10.55R.
Sugimoto, Takashi; and Noyori, Kazumasa, 4,091,339, Cl. 331-117.00R.
Suzuki, Yasoji; Tokumaru, Yukuya; and Nakai, Masanori, 4,091,296, Cl. 307-292.000.
Takase, Tsuneo, 4,090,349, Cl. 58-12.000.
Tsukada, Tameyasu; and Terashima, Masaharu, 4,090,403, Cl. 73-104.000.
Yamada, Hisashi; and Katakura, Masayuki, 4,091,295, Cl. 307-229.000.

Tollet, Marcel: *See—*
Jarleton, Paul; and Tollet, Marcel, 4,091,268, Cl. 235-424.000.

Tomasetti, Thomas A., to United States of America, Air Force. Controlled depth of burial penetrator. 4,090,446, Cl. 102-7.200.

Tomka, Jiri George: *See—*
Brydon, Donald Lithgow; and Tomka, Jiri George, 4,091,159, Cl. 428-236.000.

Tomlinson, Francis E. Fire fighting helicopter. 4,090,567, Cl. 169-53.000.

Tonomura, Shinji: *See—*
Kikumoto, Ryoji; Tobe, Akihiro; Tonomura, Shinji; and Ikoma, Hidenobu, 4,091,114, Cl. 424-330.000.

Tosa, Tetsuya: *See—*
Chibata, Ichiro; Tosa, Tetsuya; Mori, Takao; Watanabe, Taizo; Sano, Ryujiro; and Matuo, Yuhsi, 4,090,919, Cl. 195-63.000.

Toth, Bela: *See—*
Boros, Jozsef; Ferenczi, Tibor; Horvath, Gyula; Lazar, Ferenc; Lengyel, Laszlo; Matyasi, Jozsef; Orban nee Kelemen, Maria; Pinter, Tihamer; Sigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Bela; Voros, Istvan; Wentzely, Kalman; Zambo, Janos; and Zoldi, Jozsef, 4,091,071, Cl. 423-121.000.

Toto Electric Industry Co.: *See—*
Igarashi, Isaburo; Iizuka, Kazuriki; and Otsuka, Hiroshi, 4,091,462, Cl. 366-17.000.

Toulios, Peter P.: *See—*
Knox, Robert M.; and Toulios, Peter P., 4,091,343, Cl. 333-10.000.

Towmotor Corporation: *See—*
Blaha, James G.; Dineen, John R.; and Wible, John E., 4,091,372, Cl. 340-282.000.

Townsend & Townsend, trustee: *See—*
Nelson, Arthur L., 4,091,062, Cl. 264-85.000.

Toyo Soda Manufacturing Co., Ltd.: *See—*
Nagano, Mineo; Saitoh, Michio; Awazawa, Shigeru; and Tanaka, Koji, 4,090,994, Cl. 260-31.80R.

Toyoda-Koki Kabushiki-Kaisha: *See—*
Kobayashi, Akiyoshi; and Nakayama, Yukihiro, 4,090,331, Cl. 51-134.50R.
Suzuki, Hiroshi; Tsujiuchi, Toshio; and Goto, Masanobu, 4,090,743, Cl. 308-9.000.

Toyota, Hiroshi: *See—*
Kawamoto, Tamio; Takahashi, Asao; and Toyota, Hiroshi, 4,091,348, Cl. 251-129.000.

Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Komiyama, Yoshiro; Kondo, Katsumi; Asano, Yoichiro; and Ando, Mituo, 4,091,245, Cl. 200-19.00R.
Sugimoto, Hiroshi; and Nishikawa, Kazuyoshi, 4,090,748, Cl. 308-121.000.
Yoshida, Masakazu, 4,090,482, Cl. 123-119.00A.

Trageser, James J.: *See—*
Brown, Joseph L., Jr.; Fragomeni, Dominic; and Trageser, James J., 4,091,228, Cl. 13-32.000.

Transco Energy Company: *See—*
Cook, Harold L., Jr.; and Geer, Ernest C., 4,090,564, Cl. 166-314.000.

Trecek, James Bryan: *See—*
Alexanderson, Verner; Trecek, James Bryan; and Vanderwaart, Cornelius Marsden, 4,091,042, Cl. 260-645.000.

Trefimetaux: *See—*
Michel, Raymond; and Whitwham, Donald, 4,090,699, Cl. 266-252.000.
Tregoning, William Leonard. Cable termination assembly with cast conductive shield and method of making same. 4,090,767, Cl. 339-143.00R.
Tregoning, William Leonard. Adaptor back-shell for cable-assembly junctions. 4,090,768, Cl. 339-143.00R.
Treuner, Uwe D.: *See—*
Breuer, Hermann; and Treuner, Uwe D., 4,091,212, Cl. 544-27.000.
Trimble, James A.; and Crosby, Ervin L. Multiple cylinder sinusoidal engine. 4,090,478, Cl. 123-58.00R.
Trio Kabushiki Kaisha: *See—*
Sakaida, Kaku, 4,091,241, Cl. 179-15.0BT.
Trubiano, Antoine, to Cari-All Inc. Collapsible pallet container. 4,090,633, Cl. 220-6.000.
TRW Inc.: *See—*
McKee, William H.; and Witte, Roy, 4,090,770, Cl. 339-206.00R.
Tsay, Horng-Mou: *See—*
Chen, Ching-Hong; Tsay, Horng-Mou; and Heyer, Robert E., 4,090,850, Cl. 23-259.000.
Tschudy, Roland; and Schiess, Eduard, to Gebruder Buhler AG. Mixer, especially printing ink mixer. 4,091,463, Cl. 366-298.000.
Tsujiuchi, Toshio: *See—*
Suzuki, Hiroshi; Tsujiuchi, Toshio; and Goto, Masanobu, 4,090,743, Cl. 308-9.000.
Tsukada, Tameyasu; and Terashima, Masaharu, to Tokyo Shibaura Electric Co., Ltd. Apparatus for judging the useful life of tools. 4,090,403, Cl. 73-104.000.
Tsukisaka, Tsuneo; and Maruoka, Sigehiro, to Honda Giken Kogyo Kabushiki Kaisha. Closure cap for a liquid storing vessel. 4,090,634, Cl. 220-302.000.
Tsutsumi, Masaya: *See—*
Ayusawa, Saburo; Nagashima, Takeo; and Tsutsumi, Masaya, 4,091,123, Cl. 427-44.000.
Turbier, Paul; and Szekely, Laszlo, to Engins Matra. Method for the production of mouldings containing reinforcing fibre type filler. 4,091,061, Cl. 264-40.500.
Turner, Jeanette A. Foot support for sunbathers. 4,090,268, Cl. 5-327.00R.
Turner, John Harry Wallice, to Manchem Limited. Aluminum based air drying compositions. 4,090,886, Cl. 106-264.000.
Turpie, Derek William Fraser; and Klazar, Jaroslav, to South African Inventions Development Corp. Textile fibre combing. 4,090,277, Cl. 19-115.00R.
Turri, Eugenio: *See—*
Savio, Ermanno; Calamani, Sergio; and Turri, Eugenio, 4,090,677, Cl. 242-47.010.
Tuskos, Michael E., to Celanese Corporation. Methods and apparatus for spin welding thermoplastic workpieces. 4,090,898, Cl. 156-73.500.
Twin Disc, Incorporated: *See—*
White, Basil, 4,090,414, Cl. 74-733.000.
U C B Societe Anonyme: *See—*
Rodriguez, Ludovic; and Leclercq, Jacques, 4,091,027, Cl. 260-306.70C.
Uchida, Unosuke: *See—*
Takagi, Toshinori; Nishiyama, Tatsuichiro; and Uchida, Unosuke, 4,091,138, Cl. 428-209.000.
Ueda, Iwao, to Hamana Iron Works Co., Ltd. Bearing device. 4,090,742, Cl. 308-9.000.
Uemura, Masaru; Kuroki, Hitoshi; Echida, Nobuhiro; and Kosaka, Yujiro. Coated metal pipe. 4,091,134, Cl. 428-36.000.
UMC Industries, Inc.: *See—*
Jones, Thaddeus M.; Shah, Hasmukh R.; and Nash, Charles D., 4,091,271, Cl. 235-419.000.
Umeda, Hiroyuki, to Victor Company of Japan, Limited. Device for detecting an end of a cassette tape. 4,091,426, Cl. 360-74.000.
Umezawa, Hamao; Takeuchi, Tomio; Takamatsu, Akira; and Kayahara, Kenji, to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai. Treatment of elevated histamine and uric acid levels. 4,091,097, Cl. 424-230.000.
Umezawa, Hamao; Umezawa, Sumio; Fukatsu, Shunzo; Seki, Shigeo; Murase, Masao; and Yasuda, Shuntaro, to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai. N-methanesulfonic acid derivatives of 3',4'-dideoxykanamycin B. 4,091,202, Cl. 536-10.000.
Umezawa, Sumio: *See—*
Umezawa, Hamao; Umezawa, Sumio; Fukatsu, Shunzo; Seki, Shigeo; Murase, Masao; and Yasuda, Shuntaro, 4,091,202, Cl. 536-10.000.
Unangst, R. Richard: *See—*
Campbell, James A.; and Unangst, R. Richard, 4,090,639, Cl. 222-43.000.
Underhill, Thomas Travis: *See—*
Hubbard, James Henry; Leclere, Ralph Joseph; and Underhill, Thomas Travis, 4,090,787, Cl. 355-14.000.
Underwood, John R.: *See—*
Niederjohn, Wayne M.; and Underwood, John R., 4,091,349, Cl. 336-192.000.
Ungerbock, Gottfried: *See—*
Kaser, Hans-Peter; Thirion, Philippe; and Ungerbock, Gottfried, 4,091,331, Cl. 329-110.000.
Uni-Cardan AG: *See—*
Krude, Werner, 4,090,751, Cl. 308-191.000.
Union Carbide Corporation: *See—*
Dillon, Ronald David; and Fisher, John Frederick, 4,091,447, Cl. 364-200.000.
D'Silva, Themistocles D. J., 4,091,016, Cl. 260-544.00C.
Durden, John A., Jr.; Sousa, Anthony A.; and Stephen, John F., 4,091,006, Cl. 260-410.500.
Faust, Clifford C.; and Cilia, Philip F., 4,090,374, Cl. 62-341.000.
Kordesch, Karl Victor, 4,091,178, Cl. 429-60.000.
Merritt, Ben Gilbert, Jr., 4,091,181, Cl. 429-94.000.
Union Oil Company of California: *See—*
Maly, George P.; Landess, John A.; and Foral, Thomas, 4,090,562, Cl. 166-304.000.
McArthur, Dennis P., 4,091,072, Cl. 423-213.500.
Uniroyal, Inc.: *See—*
Martin, Frank S.; and Pietraszek, Thaddeus A., 4,090,716, Cl. 273-232.000.
Unitec, Inc.: *See—*
Webb, William, Jr., 4,091,364, Cl. 340-237.00S.
United States of America
Agriculture: *See—*
Craig, James C., Jr.; and Kozempel, Michael F., 4,091,005, Cl. 260-410.90N.
Morrison, John E., Jr.; and Abrams, Charlie F., Jr., 4,090,456, Cl. 111-3.000.
Rowland, Stanley P., 4,090,844, Cl. 8-120.000.
Thompson, Paul D., 4,090,471, Cl. 119-14.510.
Air Force: *See—*
Erisman, Lester R.; and Marsh, Richard A., 4,091,184, Cl. 429-139.000.
Friichtenicht, Joseph Fred, 4,091,256, Cl. 219-121.00L.
Kaufman, Irving, 4,091,279, Cl. 250-225.000.
Look, Lance G.; and Erickson, David G., 4,090,684, Cl. 244-218.000.
Martin, Gayle P., 4,091,453, Cl. 364-819.000.
Schuermeyer, Fritz L.; and Young, Charles R., 4,091,460, Cl. 365-154.000.
Tomasetti, Thomas A., 4,090,446, Cl. 102-7.200.
Wells, Robert R., 4,090,872, Cl. 75-145.000.
Army: *See—*
Chow, Sen-Te, 4,091,414, Cl. 358-174.000.
Cucksee, Marjorie T.; and Allen, Henry C., 4,090,893, Cl. 149-19.900.
Hanson, Charles M., 4,090,858, Cl. 62-6.000.
Hanson, Charles M., 4,090,859, Cl. 62-6.000.
Larsen, Ezra B.; Andrews, James R.; and Baldwin, Eugene E., 4,091,327, Cl. 324-95.000.
Marcus, Ira R.; and Lee, Albert, 4,091,325, Cl. 324-51.000.
Ogren, John R.; Ogle, Gilbert J.; and Rutkowski, Eugene V., 4,090,979, Cl. 252-441.000.
Papayoanou, Aristotle, 4,091,133, Cl. 428-36.000.
Salonimer, David J., 4,091,412, Cl. 358-108.000.
Energy: *See—*
LeVert, Francis E.; and Cox, Samson A., 4,091,288, Cl. 250-370.000.
Ludwig, Robert L., 4,090,875, Cl. 75-248.000.
Miley, George H.; Wells, William E.; and DeYoung, Russell J., 4,091,336, Cl. 331-94.50P.
Petlevich, Walter J.; and Sverdrup, Edward F., 4,091,385, Cl. 343-8.000.
Schieber, Michael M., 4,091,084, Cl. 423-491.000.
Smith, Maurice L.; and Smith, Robert M., 4,091,077, Cl. 423-298.000.
Smith, Wesley E.; and Napier, Bradley, Jr., 4,091,196, Cl. 526-73.000.
Vogel, Gerhard John; Jonke, Albert A.; and Snyder, Robert B., 4,091,076, Cl. 423-244.000.
Federal Communications Commission: *See—*
Luedtke, Arthur; and Bentley, William Ferrel, 4,091,386, Cl. 343-713.000.
Interior: *See—*
Babcock, Clarence O., 4,090,399, Cl. 73-88.00F.
Dunning, Beverly W., Jr.; and Chambers, D. Harry, 4,090,935, Cl. 204-146.000.
Finney, James L., 4,090,736, Cl. 299-30.000.
National Aeronautics and Space Administration; administrator; with respect to an invention of:
Wiley, Paris H.; and Manus, Eugene A. Logarithmic circuit with wide dynamic range. 4,091,329, Cl. 328-145.000.
National Aeronautics and Space Administration: *See—*
Kubacki, Ronald Michael, 4,091,166, Cl. 428-411.000.
Navy: *See—*
Ellis, John R.; Holma, Gary M.; and Forman, Donald B., 4,091,280, Cl. 250-231.00R.
Lebduska, Robert L., 4,090,793, Cl. 356-205.000.
Megerlin, Ferdi E., 4,090,559, Cl. 165-179.000.
Moran, David D., 4,090,812, Cl. 416-133.000.
Nielsen, Arnold T., 4,091,040, Cl. 568-853.000.
Reed, Russell; and Stanton, Horace D., 4,090,894, Cl. 149-19.910.
Roberts, Paul C., 4,090,458, Cl. 114-20.00R.
Rose, Millard F.; and Mazzie, John A., 4,090,448, Cl. 102-70.2GA.
Stoltman, Stephen, Jr.; and Tepper, Charles W., 4,090,449, Cl. 102-70.20P.
U.S. Philips Corporation: *See—*
de Jonge, Frederik Ate; Dorleijn, Jan Willem Frederik; Druyvesteyn, Willem Frederik; and Koel, Gerrit Jan, 4,091,429, Cl. 360-110.000.
Kuijpers, Franciscus Antonius; van den Enden, Adrianus Wilhelmus Maria; and Roovers, Antonius Henricus Albertus Maria, 4,091,459, Cl. 365-13.000.

van Denderen, Adrianus J.; van de Kerkhof, Marianus A. G.; Peters, Mathias A. C.; and van der Waal, Jan, 4,090,389, Cl. 72-350.000.
van der Donk, Johannes Martinus Augustinus H.; and de Kok, Jacob Jan, 4,090,293, Cl. 29-628.000.
United States Steel Corporation: *See—*
Bradley, James G.; and Wrhen, Wilmer C., 4,090,304, Cl. 33-182.000.
Brown, Joseph L., Jr.; Fragomeni, Dominic; and Trageser, James J., 4,091,228, Cl. 13-32.000.
Ives, Kenneth D.; and Vranka, Ronald S., 4,090,549, Cl. 164-4.000.
United Technologies Corporation: *See—*
Angelbeck, Albert Wolcott; Vinje, Edward Wayne; Wisner, George Robert; Freeman, Ronald Harold; Reynolds, Harold C., Jr.; and Witt, Donald Lee, 4,091,274, Cl. 250-201.000.
Fuller, William Brewster; Potter, Edwin F., Jr.; and Marcus, Melvin Arnold, 4,091,273, Cl. 250-199.000.
Mendelsohn, Charles; and Luther, Holger Martin, 4,091,311, Cl. 315-382.000.
Wright, Robert Joseph; Mullaly, James Roy; and Hecht, Ralph Julius, 4,090,941, Cl. 204-298.000.
University of Akron, The: *See—*
Chen, Chun-Fu, 4,091,236, Cl. 179-1.0FS.
UOP Inc.: *See—*
Hayes, John C., 4,090,952, Cl. 208-139.000.
Welsh, Lawrence B.; and Leyerle, Richard W., 4,090,978, Cl. 252-425.300.
Upjohn Company, The: *See—*
Argoudelis, Alexander D.; and Johnson, LeRoy E., 4,091,201, Cl. 536-17.000.
Jariwala, Sharad L., 4,091,204, Cl. 536-11.000.
Wright, John B., 4,091,011, Cl. 260-465.00D.
Urquizar, Rolando: *See—*
Pollock, Douglas; Sobarzo, Omar; Urquizar, Rolando; Vilches, Carlos; and Bolanos, Jaime, 4,090,870, Cl. 75-74.000.
Uyeda, Tim M., to La Gard, Inc. Key decoding apparatus. 4,090,303, Cl. 33-174.00F.
Vaeth, Guenter: *See—*
Hartmann, Hans Joerg; Vaeth, Guenter; and Kopke, Helmut, 4,091,143, Cl. 428-328.000.
Vahaviolos, Sotirios John, to Western Electric Company, Inc. Methods and apparatus for the non-destructive testing of bonded articles. 4,090,400, Cl. 73-88.00B.
Valhalla Scientific Incorporated: *See—*
Thrap, Guy Carlyle, 4,091,333, Cl. 330-100.000.
Vallee, Louis Leonce. Ventilators. 4,090,435, Cl. 98-42.00A.
Vandegaer, Jan Edmond, to Dart Industries Inc. Ethylene-vinyl acetate copolymerization process. 4,091,200, Cl. 528-495.000.
van de Kerkhof, Marianus A. G.: *See—*
van Denderen, Adrianus J.; van de Kerkhof, Marianus A. G.; Peters, Mathias A. C.; and van der Waal, Jan, 4,090,389, Cl. 72-350.000.
van Denderen, Adrianus J.; van de Kerkhof, Marianus A. G.; Peters, Mathias A. C.; and van der Waal, Jan, to U.S. Philips Corporation. Method of drawing a shadow mask. 4,090,389, Cl. 72-350.000.
van den Enden, Adrianus Wilhelmus Maria: *See—*
Kuijpers, Franciscus Antonius; van den Enden, Adrianus Wilhelmus Maria; and Roovers, Antonius Henricus Albertus Maria, 4,091,459, Cl. 365-13.000.
van der Donk, Johannes Martinus Augustinus H.; and de Kok, Jacob Jan, to U.S. Philips Corporation. Method of manufacturing an electrical component comprising connection tags. 4,090,293, Cl. 29-628.000.
van der Lely, Cornelis. Soil cultivating implements. 4,090,569, Cl. 172-59.000.
van der Lely, Cornelis. Soil cultivating implements. 4,090,571, Cl. 172-169.000.
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Vanderwaart, Cornelius Marsden: *See—*
Alexanderson, Verner; Trecek, James Bryan; and Vanderwaart, Cornelius Marsden, 4,091,042, Cl. 260-645.000.
Vanek, James C.: *See—*
Franz, Helmut; and Vanek, James C., 4,091,128, Cl. 427-304.000.
Van Horn, Frederick M. Hydrotherapy tank. 4,090,507, Cl. 128-66.000.
Van Mullekom, Hubert Peter, to Ruti-Te Strake B.V. Weaving loom comprising a pneumatically operated storage device. 4,090,536, Cl. 139-452.000.
Vapor Corporation: *See—*
Simanskis, Imantas; and Caldwell, Richard K., 4,090,719, Cl. 277-125.000.
Varava, Leonid Mikhailovich: *See—*
Babasov, Mikhail Vladimirovich; Zazimko, Viktor Afanasievich; Reidemeister, Iraida Ivanovna; Semenenko, Jury Lukich; Pertsikov, Zelik Ilich; Levin, Mikhail Samuilovich; Eremeev, Valery Konstantinovich; and Varava, Leonid Mikhailovich, 4,090,381, Cl. 72-68.000.
Varisco, Angelo: *See—*
Leftheris, Basil P.; and Varisco, Angelo, 4,091,260, Cl. 219-149.000.
Varma, Ravi K., to E. R. Squibb & Sons, Inc. 17-Alkylthio (and arylthio)-1′,2′,3′,4′-tetrahydroandrosteno [16 α, 17 α-b]naphthalenes and derivatives. 4,091,036, Cl. 260-397.450.
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Farwer, Alfward; Kujawa, Wolfgang; and Schulze, Klaus, 4,091,189, Cl. 429-181.000.
Vasseur, Jean Pierre: *See—*
Riethmuller, Jacques; and Vasseur, Jean Pierre, 4,091,416, Cl. 358-111.000.
Vaughan, David Evan William, to W. R. Grace & Co. Zeolite VK-2. 4,091,079, Cl. 423-328.000.
Vaughan, Kenneth F. Environmental control system. 4,090,370, Cl. 62-91.000.
Veloz, Jaime: *See—*
Riggs, William F.; Veloz, Jaime; and Dahlberg, Harry R., 4,091,070, Cl. 423-41.000.
Venuto, Paul B.: *See—*
Owen, Hartley; and Venuto, Paul B., 4,090,949, Cl. 208-78.000.
Vermilyea, David A.: *See—*
Healy, William A.; Ward, William J., III; and Vermilyea, David A., 4,090,849, Cl. 23-253.0TP.
Verrone, Patrick V.: *See—*
Laird, Richard J.; and Verrone, Patrick V., 4,090,552, Cl. 164-438.000.
Verschure, Pietrus J. M. Offshore drilling platform with vertically movable legs. 4,090,367, Cl. 61-91.000.
Vesperman, William Charles: *See—*
Congdon, Wayne Irving; Mottine, John Joseph; and Vesperman, William Charles, 4,090,763, Cl. 339-103.00M.
Vickers-Intertek Limited: *See—*
Ball, Kenneth, 4,090,366, Cl. 61-69.00R.
Vickers Limited: *See—*
Hicks, Raymond John, 4,090,416, Cl. 74-785.000.
Vickland, Jack M., to Ford Aerospace & Communications Corp. Cyclic motion generator. 4,090,413, Cl. 74-665.0GB.
Victor Company of Japan, Limited: *See—*
Omori, Yasuo; and Kataoka, Hiroshi, 4,091,420, Cl. 358-184.000.
Umeda, Hiroyuki, 4,091,426, Cl. 360-74.000.
Vilches, Carlos: *See—*
Pollock, Douglas; Sobarzo, Omar; Urquizar, Rolando; Vilches, Carlos; and Bolanos, Jaime, 4,090,870, Cl. 75-74.000.
Vincent, Clarence K. Go-cart guard rail. 4,090,694, Cl. 256-13.100.
Vinje, Edward Wayne: *See—*
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Stoev, Stoycho Mitrev; Vuchev, Yordan Vladimirov; Kuzev, Lyubomir Vladimirov; and Atzinov, Georgi Petrov, 4,090,937, Cl. 204-180.00R.
Vistan Corporation: *See—*
Chall, Harold J.; and Cimperman, Frederick J., 4,090,439, Cl. 99-494.000.
Vititsky, Anatoli. Vehicle sun visor. 4,090,732, Cl. 296-97.00C.
Vitchenko, Vladimir Stepanovich; Smirnov, Gennady Konstantinovich; and Shalaev, Vladimir Grigorievich. Device to electrically connect rotor winding of synchronous electrical machine to exciter. 4,091,299, Cl. 310-71.000.
Vitek, Robert, to Kores Holding Zug AG. Hot-melt adhesive compound and method for the production of the same. 4,091,195, Cl. 526-52.000.
Vivat, Michel: *See—*
Buendia, Jean; and Vivat, Michel, 4,091,226, Cl. 560-122.000.
Vock, Manfred Hugo: *See—*
Schreiber, William L.; Siano, James N.; Vock, Manfred Hugo; and Shuster, Edward J., 4,090,985, Cl. 252-522.000.
Vogel, Gerhard John; Jonke, Albert A.; and Snyder, Robert B., to United States of America, Energy. Method of removing sulfur emissions from a fluidized-bed combustion process. 4,091,076, Cl. 423-244.000.
Volkert, Willi, to Grundig E.M.V. Elektro-Mechanische Versuchsanstalt Max Grundig. Apparatus for automatically soldering components to printed-circuit boards. 4,090,654, Cl. 228-40.000.
Volkmar, Willi, to Carl Walther, Sportwaffenfabrik. Firing pin safety device for hand firearms. 4,090,316, Cl. 42-70.00F.
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Gospodar, Reinhard, 4,090,481, Cl. 123-103.00E.
Riedel, Wolfgang, 4,090,728, Cl. 293-71.00R.
Vollmer, Hartfrid; Elsner, Georg; Lippsmeier, Bernd; and Hestermann, Klaus, to Hoechst Aktiengesellschaft. Production of tertiary phosphine oxides. 4,091,012, Cl. 260-465.100.
von der Ohe, Walter; and Lange, Hans-Jurgen, to Fried. KRUPP Gesellschaft mit beschrankter Haftung. Injection die casting apparatus, especially for making molded parts of thermoplast-structural foam. 4,090,836, Cl. 425-574.000.
Von Hein, Eduard, to Maschinenfabrik Wifag. Cutting device for a folding apparatus of a rotary printing machine. 4,090,701, Cl. 270-21.000.
von Linde, Joachim: *See—*
von Linde, Robert; von Linde, Joachim; and Kurz, German, 4,090,839, Cl. 431-89.000.
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Voros, Istvan: *See—*
Boros, Jozsef; Ferenczi, Tibor; Horvath, Gyula; Lazar, Ferenc; Lengyel, Laszlo; Matyasi, Jozsef; Orban nee Kelemen, Maria; Pinter, Tihamer; Sigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Bela; Voros, Istvan; Wentzely, Kalman; Zambo, Janos; and Zoldi, Jozsef, 4,091,071, Cl. 423-121.000.
Vranka, Ronald S.: *See—*
Ives, Kenneth D.; and Vranka, Ronald S., 4,090,549, Cl. 164-4.000.

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Goeman, Friedrich, 4,090,884, Cl. 106-99.000.

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Vaughan, David Evan William, 4,091,079, Cl. 423-328.000.

Waage, Bard Meyer. Workpiece feeder arrangement. 4,090,423, Cl. 82-2.500.

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Betta, Walter, 4,090,675, Cl. 242-47.000.

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Suzuki, Tadao; and Wachi, Shigeaki, 4,091,434, Cl. 361-100.000.

Wagner, Clyde M.; and Wagner, John H. Solar powered spinning apparatus. 4,090,715, Cl. 273-141.00A.

Wagner Electric Corporation: *See—*
Siiberg, Hemming, 4,091,250, Cl. 200-84.00C.

Wagner, Friedrich: *See—*
Hirschvogel, Alfred; and Wagner, Friedrich, 4,091,083, Cl. 423-415.00R.

Wagner, John H.: *See—*
Wagner, Clyde M.; and Wagner, John H., 4,090,715, Cl. 273-141.00A.

Wagner, Nick J. Safety brake. 4,090,584, Cl. 182-5.000.

Wakabayashi, Kiyoshige: *See—*
Chichibu, Kenji; and Wakabayashi, Kiyoshige, 4,091,089, Cl. 424-12.000.

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Ito, Shinichi; Tanaka, Toshiharu; and Wakabayashi, Noriaki, 4,091,266, Cl. 219-504.000.

Wakita, Shizuo: *See—*
Aoki, Yukio; Wakita, Shizuo; Kato, Shoichi; Tejima, Iwao; and Ishida, Shuichi, 4,091,109, Cl. 424-304.000.

Walker, David G., to Tenneco Chemicals, Inc. Process for the purification of liquid sorbents that comprise bimetallic salt complexes. 4,091,045, Cl. 260-677.00A.

Walker, Wilmer David, Jr. Safety matchbook. 4,090,605, Cl. 206-110.000.

Wallace Murray Corporation: *See—*
Blair, Everett George, 4,090,596, Cl. 192-58.00B.

Walsh, Thomas P.: *See—*
Hubbard, Howard H.; and Walsh, Thomas P., 4,090,834, Cl. 425-470.000.

Walter Wiedmer Plastikform: *See—*
Wiedmer, Walter, 4,090,630, Cl. 215-320.000.

Walters, Jerry. Portable hydraulic hoist for vehicular engines. 4,090,625, Cl. 214-77.00R.

Walworth, Bryant Leonidas, to American Cyanamid Company. 1,2-Dialkyl-3(or 3,5)-N-heterocyclic pyrazolium salts or derivatives thereof as fungicidal agents. 4,091,106, Cl. 424-273.00P.

Wang, Chih Chun; Lausman, Thomas Clifford; and Bates, Ronald Frank, to RCA Corporation. Method of regenerating a lead monoxide target layer of a camera tube. 4,090,758, Cl. 316-2.000.

Wang, Samuel Shan-Ning; and Smith, Eugene Leroy, Jr., to American Cyanamid Company. Effective promoter extender for conventional fatty acids in non-sulfide mineral flotation. 4,090,972, Cl. 252-61.000.

Wanner, Karl; Paule, Kurt; Adam, Hermann; and Reibetanz, Wilbert, to Robert Bosch GmbH. Power tool with dust collecting arrangement. 4,090,297, Cl. 30-124.000.

Ward, Clifford, to Ashland Oil, Inc. Method for oxidizing mercaptans and mercaptide compounds from aqueous alkaline solutions and hydrocarbon distillates. 4,090,954, Cl. 208-206.000.

Ward, Thomas F.: *See—*
Ott, John J.; Ward, Thomas F.; and Cyr, Richard D., 4,091,186, Cl. 429-157.000.

Ward, William J., III: *See—*
Healy, William A.; Ward, William J., III; and Vermilyea, David A., 4,090,849, Cl. 23-253.0TP.

Wasko, George, to Textron Inc. Separable slide fastener. 4,090,279, Cl. 24-205.11F.

Watanabe, Masanori; Onda, Eiichi; Koyama, Mitsuo; Nemoto, Ichiro; and Nakagawa, Tadashi, to Seiko Koki Kabushiki Kaisha. Driving force-adjusting mechanism for camera shutter. 4,091,401, Cl. 354-266.000.

Watanabe, Taizo: *See—*
Chibata, Ichiro; Tosa, Tetsuya; Mori, Takao; Watanabe, Taizo; Sano, Ryujiro; and Matuo, Yuhsi, 4,090,919, Cl. 195-63.000.

Watanabe, Tohru: *See—*
Kanazawa, Shogo; Nakashima, Akira; Yamato, Kazunari; Seriu, Naoyuki; Watanabe, Tohru; and Nakazawa, Susumu, 4,091,147, Cl. 428-683.000.

Watanabe, Yoshiaki: *See—*
Kozuki, Susumu; Sunouchi, Akio; and Watanabe, Yoshiaki, 4,091,395, Cl. 354-173.000.

Waters, Elmer D.: *See—*
Anderson, John H.; and Waters, Elmer D., 4,090,555, Cl. 165-76.000.

Watson, Alan; Hohmann, Peter; Schmid, Herbert; and Schneider, Helmut, to Linde Aktiengesellschaft. Production of a gas rich in methane. 4,091,008, Cl. 260-450.000.

Waugh, Richard Allen: *See—*
Keel, David LeRoy; and Waugh, Richard Allen, 4,090,881, Cl. 106-68.000.

Wavecom Industries: *See—*
LaTourrette, Peter Myers, 4,091,344, Cl. 333-73.00S.

Weatherford/Lamb, Inc.: *See—*
Weiner, Peter D.; Calhoun, Charles W.; Collins, Jerry A.; and Mee, Gary Lynn, 4,091,451, Cl. 364-506.000.

Webb, William, Jr., to Unitec, Inc. Combustion detection device. 4,091,364, Cl. 340-237.00S.

Weber, Abraham: *See—*
Bouzard, Daniel; and Weber, Abraham, 4,091,215, Cl. 544-30.000.

Weber AG, Fabrik Elektro-Technischer Artikel und Apparate: *See—*
Flory, Josef; and Kuhn, Ernst, 4,091,351, Cl. 337-62.000.

Weber, Hermann P. Method for injection molding lenses. 4,091,057, Cl. 264-1.000.

Webster, Ronald F. Adjustable buoyancy fishing bobber. 4,090,318, Cl. 43-43.140.

Wechter, Stephen George, to Airco, Inc. Treatment and packaging of gas handling equipment. 4,090,341, Cl. 53-21.00R.

Wedin, Sten Henrik; and Lindberg, Torsten Gunnar, to AB Volvo. Apparatus acting reinforcingly in collisions to protect rearwardly placed fuel tanks in vehicles from deformation damages. 4,090,721, Cl. 280-5.00A.

Weidlich, Franz. Carburetor device, especially for internal combustion engines. 4,090,483, Cl. 123-119.00A.

Weiner, Peter D.; Calhoun, Charles W.; Collins, Jerry A.; and Mee, Gary Lynn, to Weatherford/Lamb, Inc. Method of and apparatus for making up a threaded connection. 4,091,451, Cl. 364-506.000.

Weir, Edgar V.: *See—*
Wooding, Patrick J.; and Weir, Edgar V., 4,091,229, Cl. 13-33.000.

Weisbach, Jerry Arnold: *See—*
Hoover, John Russel Eugene; and Weisbach, Jerry Arnold, 4,091,227, Cl. 560-9.000.

Weiss, Jurgen: *See—*
Morsbach, Martin; Johren, Paul; and Weiss, Jurgen, 4,090,720, Cl. 277-140.000.

Welch, Albert B., to Nygaard-Welch-Rushing Partnership. Method and apparatus for laser treatment of geological formations. 4,090,572, Cl. 175-16.000.

Welch Allyn, Inc.: *See—*
Pilgrim, William S., 4,090,506, Cl. 128-11.000.

Weller, Kenneth P.: *See—*
Lee, Don H.; Weller, Kenneth P.; and Thrower, William F., 4,091,408, Cl. 357-56.000.

Wells, Robert R., to United States of America, Air Force. Aluminum base brazing alloy. 4,090,872, Cl. 75-145.000.

Wells, Sharon L.: *See—*
Ohrenstein, Henry; and Wells, Sharon L., 4,091,443, Cl. 362-156.000.

Wells, William E.: *See—*
Miley, George H.; Wells, William E.; and DeYoung, Russell J., 4,091,336, Cl. 331-94.50P.

Welsh, Lawrence B.; and Leyerle, Richard W., to UOP Inc. Electrocatalysts and a method for the preparation thereof. 4,090,978, Cl. 252-425.300.

Wenger, George Michael: *See—*
Chu, Tze Yao; and Wenger, George Michael, 4,090,843, Cl. 432-197.000.

Weninger, Frank L., to Bell & Howell Company. Low noise blower clutch. 4,090,785, Cl. 353-57.000.

Wentzely, Kalman: *See—*
Boros, Jozsef; Ferenczi, Tibor; Horvath, Gyula; Lazar, Ferenc; Lengyel, Laszlo; Matyasi, Jozsef; Orban nee Kelemen, Maria; Pinter, Tihamer; Sigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Bela; Voros, Istvan; Wentzely, Kalman; Zambo, Janos; and Zoldi, Jozsef, 4,091,071, Cl. 423-121.000.

Wenzel, William L.: *See—*
Robertson, Melvin W.; and Wenzel, William L., 4,091,352, Cl. 337-187.000.

Werkzeugmaschinenfabrik Oerlikon-Buhrle: *See—*
Kotthaus, Erich; and Hildinger, Otto, 4,090,428, Cl. 90-6.000.

Wesenberg, Hans-Ulrich. Manned toy aircraft. 4,090,323, Cl. 46-74.00R.

Western Electric Company, Inc.: *See—*
Chu, Tze Yao; and Wenger, George Michael, 4,090,843, Cl. 432-197.000.
McPherson, Charles Allen, 4,091,127, Cl. 427-304.000.
Myers, Daryl Lester, 4,090,896, Cl. 156-51.000.
Vahaviolos, Sotirios John, 4,090,400, Cl. 73-88.00B.

Westinghouse Air Brake Company: *See—*
Pappas, Spiro J., 4,090,685, Cl. 246-125.000.

Westinghouse Electric Corp.: *See—*
Quirk, James F., 4,091,139, Cl. 428-244.000.
Rogoff, Gerald L., 4,090,856, Cl. 55-11.000.
Segar, William R., 4,090,452, Cl. 104-247.000.
Sun, Kuan-Han, 4,091,283, Cl. 250-303.000.

Westport International, Inc.: *See—*
Hellman, Robert R.; and French, Douglas M., 4,091,328, Cl. 325-37.000.

Wheatley, Carl Franklin, Jr., to RCA Corporation. Semiconductor device having symmetrical current distribution. 4,091,409, Cl. 357-68.000.

Whirlpool Corporation: *See—*
Lindenschmidt, Robert Edward, 4,090,641, Cl. 222-70.000.

White, Basil, to Twin Disc, Incorporated. Transmission control system for shuttle type vehicles. 4,090,414, Cl. 74-733.000.

Whiting, David Andrew: *See—*
Blankenhorn, Paul Richard; Whiting, David Andrew; and Kline, Donald Edgar, 4,091,148, Cl. 427-314.000.

Whitney, Douglas A.: *See*—
Burcz, Lawrence D.; and Whitney, Douglas A., 4,090,417, Cl. 74-864.000.

Whitten, James R., to General Electric Company. Time delay modulator. 4,091,342, Cl. 332-29.00R.

Whitwham, Donald: *See*—
Michel, Raymond; and Whitwham, Donald, 4,090,699, Cl. 266-252.000.

Wible, John E.: *See*—
Blaha, James G.; Dineen, John R.; and Wible, John E., 4,091,372, Cl. 340-282.000.

Widergren, Robert D., to Compression Labs, Inc. Facsimile compression system. 4,091,424, Cl. 358-260.000.

Wiebe, Donald, to A. Stucki Company. Resilient railway truck side bearing. 4,090,750, Cl. 308-138.000.

Wiedmer, Walter, to Walter Wiedmer Plastikform. Container closure. 4,090,630, Cl. 215-320.000.

Wilbraham, Kenneth J.: *See*—
Clayfield, Eric J.; Lumb, Ernest C.; and Wilbraham, Kenneth J., 4,090,853, Cl. 44-51.000.

Wiley, Paris H.: *See*—
United States of America, National Aeronautics and Space Administration; Wiley, Paris H.; and Manus, Eugene A., 4,091,329, Cl. 328-145.000.

Wilkes, Alan Leonard: *See*—
Chu, Simon Long; Golda, Eugene; and Wilkes, Alan Leonard, 4,090,880, Cl. 96-86.00R.

Wilkinson, Everett R., Jr.; and Cooper, Henry E., IV, to Terrell Corporation, The. Hot melt applicator. 4,090,643, Cl. 222-146.0HE.

Wilkinson, Stanley B., to General Electric Company. Protective relay circuit for interphase faults. 4,091,433, Cl. 361-76.000.

Willey, Norman W.: *See*—
Malsby, Marc W.; and Willey, Norman W., 4,090,764, Cl. 339-103.00M.

Willhelm, Jorg; and Kaul, Dietmar, to Ernst Leitz GmbH. Light modulation system. 4,091,281, Cl. 250-237.00G.

Williams, Richard E. Orthodontic appliance. 4,090,299, Cl. 32-14.00A.

Williams, Robert Powell; and Polinsky, Murray Arthur, to RCA Corporation. Combination glass/low temperature deposited $Si_xN_yH_zO_z$ passivating overcoat with improved crack and corrosion resistance for a semiconductor device. 4,091,407, Cl. 357-54.000.

Williams, Robert W. Litter box. 4,090,470, Cl. 119-1.000.

Williams, Roy G. Training tennis racket. 4,090,710, Cl. 273-75.000.

Williamson, Donald Farrington. Dispenser for conical container. 4,090,637, Cl. 221-92.000.

Willis, Daniel H.: *See*—
Smith, Richard L.; Farrar, Ralph C.; and Willis, Daniel H., 4,091,198, Cl. 526-178.000.

Willover, Larry Neil, to Ingersoll-Rand Company. Means for lubricating machine components. 4,090,588, Cl. 184-11.00A.

Wilmot Engineering Co.: *See*—
Benzon, William, 4,090,956, Cl. 209-211.000.

Wilson, John Gerald: *See*—
Hunt, Frederick Charles; and Wilson, John Gerald, 4,091,088, Cl. 424-1.000.

Wilson, Joseph Townsend, III: *See*—
Smith, Normand Coy; and Wilson, Joseph Townsend, III, 4,091,390, Cl. 346-75.000.

Wilwerding, Dennis J., to Honeywell Inc. Automatic focus system with oscillation inhibit circuit. 4,091,275, Cl. 250-201.000.

Windish, Willis E.: *See*—
Gorrell, James M.; Collins, Terry R.; and Windish, Willis E., 4,090,415, Cl. 74-769.000.

Wineburner, Ronald E.: *See*—
Hoehn, Richard F.; Allen, Norman R.; and Wineburner, Ronald E., 4,090,693, Cl. 254-187.500.

Winkler, Hans J. S., to Shell Oil Company. Process for the removal of H_2S and CO_2 from gaseous streams. 4,091,073, Cl. 423-226.000.

Winter, Gerhard: *See*—
Rademachers, Jakob; Hund, Franz; Pflugmacher, Ingo; and Winter, Gerhard, 4,090,888, Cl. 106-304.000.

Wirz, Arno, to Heidelberger Druckmaschinen AG. Suction air control device for use with sheet feeds. 4,090,702, Cl. 271-108.000.

Wisner, George Robert: *See*—
Angelbeck, Albert Wolcott; Vinje, Edward Wayne; Wisner, George Robert; Freeman, Ronald Harold; Reynolds, Harold C., Jr.; and Witt, Donald Lee, 4,091,274, Cl. 250-201.000.

Witt, Chester J.; and Thompson, Richard M., to Mojonnier Bros. Co. Gas pressure stabilizer system and valve. 4,090,526, Cl. 137-209.000.

Witt, Donald Lee: *See*—
Angelbeck, Albert Wolcott; Vinje, Edward Wayne; Wisner, George Robert; Freeman, Ronald Harold; Reynolds, Harold C., Jr.; and Witt, Donald Lee, 4,091,274, Cl. 250-201.000.

Witte, Roy: *See*—
McKee, William H.; and Witte, Roy, 4,090,770, Cl. 339-206.00R.

Wittke, James Pleister, to RCA Corporation. Method of aligning optical fibers with light emitting optical devices. 4,090,777, Cl. 350-96.150.

Wolf, William Henry. Motorcycle tire changing machine. 4,090,548, Cl. 157-1.170.

Wolfe, Henry S., to American Clearwater Corp. Fishing lure. 4,090,319, Cl. 43-42.190.

Wolnowsky, Howard Ervin; Belland, Erling Norris; and Lee, Harry Thomas, to Lockheed Missiles & Space Company, Inc. Bi-Phase harmonic histogram pitch extractor. 4,091,237, Cl. 179-1.0SC.

Wood, George Edson: *See*—
Simmons, James Almy; Wood, George Edson; and Jacquemin, Paul Leroy, 4,090,866, Cl. 71-108.000.

Wooding Corporation: *See*—
Wooding, Patrick J.; and Weir, Edgar V., 4,091,229, Cl. 13-33.000.

Wooding, Patrick J.; and Weir, Edgar V., to Wooding Corporation. Slag and alloy feeding based on electrode weight. 4,091,229, Cl. 13-33.000.

Woods, John M.; Porter, Marion G.; and Monahan, Earnest M., to Honeywell Information Systems Inc. Input/output maintenance access apparatus. 4,091,455, Cl. 364-200.000.

Woolcombers Limited: *See*—
Clark, Edward Watson, 4,091,035, Cl. 260-397.250.

Woolley, George. Method of making hollow globular roller. 4,090,283, Cl. 29-159.00R.

Wootten, William A. Apparatus for forming a structural medium. 4,090,384, Cl. 72-186.000.

Workman, William, Jr., to Gardner-Denver Company. Low pressure shutoff valve for fluid operated tool. 4,090,688, Cl. 251-25.000.

Woytek, Andrew Joseph; and Lileck, John Theodore, to Air Products and Chemicals, Inc. Preparation of nitrogen trifluoride. 4,091,081, Cl. 423-406.000.

Wrhen, Wilmer C.: *See*—
Bradley, James G.; and Wrhen, Wilmer C., 4,090,304, Cl. 33-182.000.

Wright, Gordon C., to MW Industries, Inc. Nonmetallic vent with integral screen. 4,090,436, Cl. 98-66.00R.

Wright, John B., to Upjohn Company, The. 3-Cyano-oxanilic acid derivatives. 4,091,011, Cl. 260-465.00D.

Wright, Robert Joseph; Mullaly, James Roy; and Hecht, Ralph Julius, to United Technologies Corporation. Cathode sputtering apparatus. 4,090,941, Cl. 204-298.000.

Wu, Paul S.; and Tandon, Jagdish C., to Litton Business Systems, Inc. Analog to digital wave shaping system. 4,091,379, Cl. 340-347.0AD.

Xerox Corporation: *See*—
Bobbe, Richard M., 4,090,786, Cl. 355-4.000.
Smith, Richard E.; Hamlin, Thomas J.; Stange, Klaus K.; and Cassano, James R., 4,090,704, Cl. 271-246.000.

Yahner, Joseph A.: *See*—
Beck, James R.; and Yahner, Joseph A., 4,091,096, Cl. 424-229.000.

Yajima, Toshio: *See*—
Yano, Matsunosuke; Yajima, Toshio; and Ohta, Terukazu, 4,090,676, Cl. 242-18.0DD.

Yakovlev, Lev Mikhailovich: *See*—
Folomin, Anatoly Alexandrovich; Fesenko, Vsevolod Karpovich; Evgrafov, Konstantin Georgievich; Yakovlev, Lev Mikhailovich; and Petrov, Arnold Ivanovich, 4,090,597, Cl. 192-85.0AA.

Yamada, Hisashi; and Katakura, Masayuki, to Tokyo Shibaura Electric Co., Ltd. Transistor circuit. 4,091,295, Cl. 307-229.000.

Yamada, Noboru: *See*—
Ohta, Takeo; Takenaga, Mutsuo; Akahira, Nobuo; Yamada, Noboru; and Yamashita, Tadaoki, 4,091,171, Cl. 428-539.000.

Yamagata, Tetuo: *See*—
Higuchi, Minoru; and Yamagata, Tetuo, 4,090,619, Cl. 214-16.00R.

Yamaguchi, Akihiro: *See*—
Okazaki, Mitsuo; Yamaguchi, Akihiro; and Sasaki, Masaomi, 4,091,208, Cl. 542-454.000.

Yamaha Hatsudoki Kabushiki Kaisha: *See*—
Iio, Toshimitsu, 4,090,739, Cl. 303-10.000.

Yamai, Fumito: *See*—
Saito, Fumio; Yamai, Fumito; Beppu, Yositugu; and Nakayama, Shinpei, 4,091,054, Cl. 260-886.000.

Yamamoto, Kaname: *See*—
Tajima, Eiichi; Yamamoto, Kaname; and Imai, Takayoshi, 4,091,135, Cl. 428-40.000.

Yamamoto, Mamoru, to Sanki Kogyo Kabushiki Kaisha. Electrodes in welding machines. 4,091,255, Cl. 219-84.000.

Yamamoto, Shigeru; and Miwa, Takashi, to Mitsubishi Jukogyo Kabushiki Kaisha. Method of endurance test with initial overloading. 4,090,401, Cl. 73-91.000.

Yamamoto, Terumasa; Miyagawa, Katsuhiko; Kunishige, Hidenori; and Nakao, Fusafumi, to Matsushita Electric Industrial Co., Ltd. Thermoluminescent dosimeter readout instrument. 4,091,284, Cl. 250-337.000.

Yamanashi, Chusaku, to Fuji Kiko Kabushiki Kaisha. Safety belt locking device. 4,090,678, Cl. 242-107.40A.

Yamaoka, Shigeyuki: *See*—
Inami, Sumio; Koike, Kiyoshi; Hayashida, Masayoshi; and Yamaoka, Shigeyuki, 4,090,734, Cl. 296-146.000.

Yamashita, Shiro. Portable piezoelectric electric generating device. 4,091,302, Cl. 310-339.000.

Yamashita, Tadaoki: *See*—
Ohta, Takeo; Takenaga, Mutsuo; Akahira, Nobuo; Yamada, Noboru; and Yamashita, Tadaoki, 4,091,171, Cl. 428-539.000.

Yamato, Kazunari: *See*—
Kanazawa, Shogo; Nakashima, Akira; Yamato, Kazunari; Seriu, Naoyuki; Watanabe, Tohru; and Nakazawa, Susumu, 4,091,147, Cl. 428-683.000.

Yamazaki, Isamu: *See*—
Kashioka, Seiji; Ejiri, Masakazu; Mese, Michihiro; Miyatake, Takafumi; Hamada, Toshimitsu; and Yamazaki, Isamu, 4,091,394, Cl. 340-146.30H.

Yano, Matsunosuke; Yajima, Toshio; and Ohta, Terukazu, to Kamitsu Seisakusho, Ltd. Yarn or thread guiding device. 4,090,676, Cl. 242-18.0DD.

Yano, Takeshi; Kanazawa, Seiichiro; Futami, Takehiro; and Ishiyama, Yasuyuki, to Nippon Electric Company, Ltd. Electromechanical filter having a wide temperature range. 4,091,345, Cl. 333-71.000.

Yarbrough, Ted G. Pipe-laying apparatus. 4,090,686, Cl. 248-49.000.

Yardney Electric Corporation: *See*—
Chireau, Roland F.; and Seidman, Sandor F., 4,091,185, Cl. 429-144.000.

Yarocki, George L.: *See*—
Piontkowski, Carl F.; and Yarocki, George L., 4,090,271, Cl. 15-243.000.

Yasuda, Shuntaro: *See*—
Umezawa, Hamao; Umezawa, Sumio; Fukatsu, Shunzo; Seki, Shigeo; Murase, Masao; and Yasuda, Shuntaro, 4,091,202, Cl. 536-10.000.

Yazawa, Fumi: *See*—
Yazawa, Toshio; and Yazawa, Fumi, 4,090,442, Cl. 101-111.000.

Yazawa, Hiromi: *See*—
Karasudani, Yasuo; and Yazawa, Hiromi, 4,090,590, Cl. 188-72.500.

Yazawa, Toshio; and Yazawa, Fumi. Hand stamp. 4,090,442, Cl. 101-111.000.

Yokogawa Electric Works, Ltd.: *See*—
Fujita, Hisaya; Kaieda, Nobuo; and Sato, Setsuo, 4,091,389, Cl. 346-32.000.

Yokota, Yukinaga: *See*—
Fukusaki, Hiroshi; Niki, Masao; and Yokota, Yukinaga, 4,090,991, Cl. 260-23.0EM.

York, Leon V. Horse trailer and corral structure. 4,090,472, Cl. 119-20.000.

Yoshida, Masakazu, to Toyota Jidosha Kogyo Kabushiki Kaisha. Exhaust gas recirculation apparatus for an internal combustion engine. 4,090,482, Cl. 123-119.00A.

Yoshinaga, Makoto: *See*—
Sawamura, Ichiro; Sogi, Shinroku; Kamachi, Shin-ichi; Yoshinaga, Makoto; Goto, Atsuo; Izawa, Masao; Nakajima, Yoshio; Gocho, Nagahiro; Shinohara, Toshio; and Hattori, Shin-ichiro, 4,090,921, Cl. 195-127.000.

Young, Charles R.: *See*—
Schuermeyer, Fritz L.; and Young, Charles R., 4,091,460, Cl. 365-154.000.

Young, D. Craig, to Caterpillar Tractor Co. Heat exchanger support system. 4,090,358, Cl. 60-39.51R.

Young, Reginald S.: *See*—
Carter, George A.; and Young, Reginald S., 4,091,060, Cl. 264-40.100.

Young, Ross. Jump rope. 4,090,705, Cl. 272-75.000.

Yu, Chin C., to Computer Peripherals, Inc. Programmable binary amplifier. 4,091,380, Cl. 340-347.0DD.

Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai: *See*—
Umezawa, Hamao; Takeuchi, Tomio; Takamatsu, Akira; and Kayahara, Kenji, 4,091,097, Cl. 424-230.000.
Umezawa, Hamao; Umezawa, Sumio; Fukatsu, Shunzo; Seki, Shigeo; Murase, Masao; and Yasuda, Shuntaro, 4,091,202, Cl. 536-10.000.

Zambo, Janos: *See*—
Boros, Jozsef; Ferenczi, Tibor; Horvath, Gyula; Lazar, Ferenc; Lengyel, Laszlo; Matyasi, Jozsef; Orban nee Kelemen, Maria; Pinter, Tihamer; Sigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Bela; Voros, Istvan; Wentzely, Kalman; Zambo, Janos; and Zoldi, Jozsef, 4,091,071, Cl. 423-121.000.

Zankl, Frank; Kirkham, Edward E.; Stobbe, Richard E.; and Schachte, John J., to Kearney & Trecker Corporation. A.C. motor control apparatus and method. 4,091,294, Cl. 318-227.000.

Zappelli, Piergiorgio; Rossodivita, Antonio; Pappa, Rosario; and Re, Luciano, to Snamprogetti, S.p.A. Adenine derivatives. 4,091,203, Cl. 536-26.000.

Zazimko, Viktor Afanasievich: *See*—
Babasov, Mikhail Vladimirovich; Zazimko, Viktor Afanasievich; Reidemeister, Iraida Ivanovna; Semenenko, Jury Lukich; Pertsikov, Zelik Ilich; Levin, Mikhail Samuilovich; Eremeev, Valery Konstantinovich; and Varava, Leonid Mikhailovich, 4,090,381, Cl. 72-68.000.

Zeff, Robert: *See*—
Richards, Mark S.; and Zeff, Robert, 4,091,265, Cl. 219-501.000.

Zeifang, Gunter, to Eltro GmbH & Co. Prism arrangement for scanning infrared images. 4,090,774, Cl. 350-6.400.

Zeigler, Philip Carl. Garden weeding tool. 4,090,730, Cl. 294-50.600.

Zenith Radio Corporation: *See*—
Ciciora, Walter S., 4,091,418, Cl. 358-160.000.
Citta, Richard W., 4,091,410, Cl. 358-24.000.
Long, Michael E., 4,091,421, Cl. 358-195.000.

Ziemkiewicz, Leonard P.: *See*—
Lee, Douglas C.; Ziemkiewicz, Leonard P.; Ardito, Victor P.; and Greco, Alex J., 4,090,551, Cl. 164-137.000.

Zimmer, Herbert, to Dornier GmbH. Airplane with two superposed wings. 4,090,681, Cl. 244-45.00R.

Zimmer, Johannes: *See*—
Gasser, Manfred, 4,090,443, Cl. 101-123.000.

Zinca, Sabin: *See*—
Teodorescu, Constantin; Chiriac, Ilie; Sava, Cornel Doru; Draghici, Adrian; and Zinca, Sabin, 4,090,814, Cl. 417-178.000.

Zindler, Hugh A.; and Pollow, Sheldon D. Brake released clutch mechanism. 4,090,595, Cl. 192-17.00R.

Zodrow, Rudolf, to Jagenberg-Werke Aktiengesellschaft. Label transfer system for a labeling station. 4,090,913, Cl. 156-560.000.

Zoldi, Jozsef: *See*—
Boros, Jozsef; Ferenczi, Tibor; Horvath, Gyula; Lazar, Ferenc; Lengyel, Laszlo; Matyasi, Jozsef; Orban nee Kelemen, Maria; Pinter, Tihamer; Sigmond, Gyorgy; Siklosi, Peter; Solymar, Karoly; Toth, Bela; Voros, Istvan; Wentzely, Kalman; Zambo, Janos; and Zoldi, Jozsef, 4,091,071, Cl. 423-121.000.

Zoller, Robert A., to Standard Products Company, The. Method of making a trim strip. 4,090,906, Cl. 156-244.270.

Zook, James David: *See*—
Bernal G., Enrique; Chen, Di; Koepke, Barry G.; and Zook, James David, 4,090,776, Cl. 350-96.120.

Zussman, Hyman W.; Knell, Martin; and Dexter, Martin, to Ciba-Geigy Corporation. Unsaturated hydantoin coagents. 4,091,223, Cl. 548-308.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 23RD DAY OF MAY, 1978

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

American Seating Company: *See*—
McClelland, Robert G.; and Raymond, David W., Re. 29,635, Cl. 52-9.000.

Ball Corporation: *See*—
Kwiatkowski, Jerome A.; and Wood, Charles L., Re. 29,642, Cl. 364-900.000.

BASF Aktiengesellschaft: *See*—
Lamm, Gunther; and Dehnert, Johannes, Re. 29,640, Cl. 260-294.900.

Battle Creek Equipment Company: *See*—
Woods, Thomas G., Re. 29,641, Cl. 219-527.000.

Citizen Watch Co., Ltd.: *See*—
Takamune, Hirotoki; and Ishida, Fujio, Re. 29,637, Cl. 58-23.0BA.

Dearling, Harry S., to Dearling, Tobe. Spray dispensing device. Re. 29,639, Cl. 222-174.000.

Dearling, Tobe: *See*—
Dearling, Harry S., Re. 29,639, Cl. 222-174.000.

Dehnert, Johannes: *See*—
Lamm, Gunther; and Dehnert, Johannes, Re. 29,640, Cl. 260-294.900.

Gilbu, Agnar, to Owens-Corning Fiberglas Corporation. Manhole and method of manufacture. Re. 29,636, Cl. 52-20.000.

Ishida, Fujio: *See*—
Takamune, Hirotoki; and Ishida, Fujio, Re. 29,637, Cl. 58-23.0BA.

Kwiatkowski, Jerome A.; and Wood, Charles L., to Ball Corporation. Programmable automatic controller. Re. 29,642, Cl. 364-900.000.

Lamm, Gunther; and Dehnert, Johannes, to BASF Aktiengesellschaft. Certain substituted 2,6-diamino-4-methyl-nicotinitriles the corresponding nicotinamides and derivatives thereof. Re. 29,640, Cl. 260-294.900.

McClelland, Robert G.; and Raymond, David W., to American Seating Company. Row folding seating structure. Re. 29,635, Cl. 52-9.000.

Nutter, Benjamin P., to Schlumberger Technology Corporation. Pressure controlled test valve system for offshore wells. Re. 29,638, Cl. 73-151.000.

Owens-Corning Fiberglas Corporation: *See*—
Gilbu, Agnar, Re. 29,636, Cl. 52-20.000.

Raymond, David W.: *See*—
McClelland, Robert G.; and Raymond, David W., Re. 29,635, Cl. 52-9.000.

Schlumberger Technology Corporation: *See*—
Nutter, Benjamin P., Re. 29,638, Cl. 73-151.000.

Takamune, Hirotoki; and Ishida, Fujio, to Citizen Watch Co., Ltd. Battery-driven watch with battery consumption display alarm. Re. 29,637, Cl. 58-23.0BA.

Wood, Charles L.: *See*—
Kwiatkowski, Jerome A.; and Wood, Charles L., Re. 29,642, Cl. 364-900.000.

Woods, Thomas G., to Battle Creek Equipment Company. Moist heating pad. Re. 29,641, Cl. 219-527.000.

LIST OF DESIGN PATENTEES

A. B. Chance Company: *See*—
Lewis, Paul E., 247,963, Cl. D13-18.000.

Acricite Company, Inc.: *See*—
Schwartz, Lawrence B., 247,994, Cl. D87-3.00F.

Adams, Ronald J. Console for underwater diving meters. 247,957, 5-23-78, Cl. D10-46.000.

Ader, Gary B., to Berkley & Company, Inc. Collapsible fishing rod. 247,972, 5-23-78, Cl. D22-23.000.

Amana Refrigeration, Inc.: *See*—
Takeuchi, Tom; Boldt, Melvin H.; and Wojtowicz, Chester J., 247,948, Cl. D7-128.000.

Anderson, Victor F., to Shell Oil Company. Shoe. 247,933, 5-23-78, Cl. D2-285.000.

Anderson, Victor F., to Shell Oil Company. Shoe. 247,934, 5-23-78, Cl. D2-287.000.

Anthony, James R. Hook. 247,951, 5-23-78, Cl. D8-382.000.

Bergstrom, Theodore R., to Thermograte, Inc. Combined fireplace front and heat exchange grate. 247,973, 5-23-78, Cl. D23-94.000.

Berkley & Company, Inc.: *See*—
Ader, Gary B., 247,972, Cl. D22-23.000.

Boldt, Melvin H.: *See*—
Takeuchi, Tom; Boldt, Melvin H.; and Wojtowicz, Chester J., 247,948, Cl. D7-128.000.

Bottcher, Dallas R. Art caddy drawing desk hook or similar article. 247,950, 5-23-78, Cl. D8-367.000.

Breneman, Jack L., to Quaker Oats Company, The. Toy helicopter. 247,985, 5-23-78, Cl. D34-15.0KK.

Byrne, Gerald. Clock. 247,956, 5-23-78, Cl. D10-10.000.

Cal Industries, Inc.: *See*—
Tobin, William J., 247,940, Cl. D6-95.000.

Calzone, Joseph E., III. Carrying case for a musical instrument or similar article. 247,993, 5-23-78, Cl. D56-1.00B.

Chancellor, Forrest E. Rotating horsehead for oilfield pump. 247,968, 5-23-78, Cl. D15-7.000.

Clairol Incorporated: *See*—
Wistrand, John, 247,979, Cl. D28-13.000.
Wistrand, John, 247,980, Cl. D28-18.000.
Wistrand, John, 247,981, Cl. D28-73.000.

Clyde, Elden. Rubber band gun. 247,986, 5-23-78, Cl. D34-15.0PT.

Coats & Clark, Inc.: *See*—
Mosher, James; Nidzgorski, Felix; and Eckhardt, George, 247,955, Cl. D9-250.000.
Mosher, James D.; Nidzgorski, Felix; and Eckhardt, George R., 247,954, Cl. D9-250.000.

Dart Industries Inc.: *See*—
Painter, David L.; and Minsky, Norman C., 247,946, Cl. D7-94.000.

Dilyard, Richard D. Rotary stand for potted plants. 247,937, 5-23-78, Cl. D6-24.000.

D'Innocente, Ralph, to Jacuzzi Whirlpool Bath, Inc. Hydromassage tub. 247,978, 5-23-78, Cl. D23-55.000.

Doerner, Frank. Chair control. 247,943, 5-23-78, Cl. D6-194.000.

Donaldson, Charles D., to Mead Corporation, The. Blank for a box cover or similar article. 247,952, 5-23-78, Cl. D9-245.000.

Dunlop Limited: *See*—
Sakaki, Nobuyuki, 247,961, Cl. D12-142.000.

E. J. Erikssons Knivfabrik: *See*—
Nordlund, Olle, 247,970, Cl. D22-1.000.

Eastman Kodak Company: *See*—
Olson, Richard Joseph, 247,969, Cl. D16-18.000.

Eckhardt, George: *See*—
Mosher, James; Nidzgorski, Felix; and Eckhardt, George, 247,955, Cl. D9-250.000.

Eckhardt, George R.: *See*—
Mosher, James D.; Nidzgorski, Felix; and Eckhardt, George R., 247,954, Cl. D9-250.000.

Gaiti, Richard. Display device for photographs and the like. 247,944, 5-23-78, Cl. D6-235.000.

Gale, John A. Attachable support bracket for the ends of horizontal shelves. 247,942, 5-23-78, Cl. D6-191.000.

Garson, Lester. Coin handling and wrapping tray. 247,992, 5-23-78, Cl. D52-4.00R.

Gem, Incorporated: *See*—
Tillinghast, Raymond C.; and Grant, William M., 247,949, Cl. D7-180.000.

Grant, William M.: *See*—
Tillinghast, Raymond C.; and Grant, William M., 247,949, Cl. D7-180.000.

Gray, Steven M. Telephone answering service console. 247,965, 5-23-78, Cl. D14-52.000.

Gregorius, Frank J. Combined vase and mounting bracket therefor. 247,941, 5-23-78, Cl. D6-137.000.

Hartnett, Edward A. Centrifugal pump. 247,967, 5-23-78, Cl. D15-7.000.

Huddy, Robert A. Inhalation mask. 247,982, 5-23-78, Cl. D29-8.000.

Hunter, William F. Vehicle license support. 247,962, 5-23-78, Cl. D12-193.000.

Jacuzzi, Roy A. Hydromassage tub. 247,977, 5-23-78, Cl. D24-38.000.

Jacuzzi Whirlpool Bath, Inc.: *See*—
D'Innocente, Ralph, 247,978, Cl. D23-55.000.

Katz, Marcella M., to Katz, Marcella M. Footwear with pocket top. 247,932, 5-23-78, Cl. D2-265.000.

Krecic, Elda, to Monet Jewelers, Inc. Pendant or similar article. 247,959, 5-23-78, Cl. D11-83.000.

Lage, David P., to Quick Point Pencil Co., Inc. Key ring. 247,995, 5-23-78, Cl. D87-8.000.
Lee, Harry S. Game table top. 247,983, 5-23-78, Cl. D34-5.00J.
Lewis, Paul E., to A. B. Chance Company. Insulator assembly. 247,963, 5-23-78, Cl. D13-18.000.
Lunde, Robert R., to Magnuson Models Inc. Doll house. 247,984, 5-23-78, Cl. D34-15.0LL.
Luther, Ronald B. Catheterization needle. 247,975, 5-23-78, Cl. D24-25.000.
MacLeod, Bruce H.: *See—*
Wortley, Austin M., Jr.; and MacLeod, Bruce H., 247,936, Cl. D4-09.000.
Magnuson Models Inc.: *See—*
Lunde, Robert R., 247,984, Cl. D34-15.0LL.
Malcolite Corporation: *See—*
Win, Murray M., 247,989, Cl. D48-16.00A.
Mead Corporation, The: *See—*
Donaldson, Charles D., 247,952, Cl. D9-245.000.
Minsky, Norman C.: *See—*
Painter, David L.; and Minsky, Norman C., 247,946, Cl. D7-94.000.
Monet Jewelers, Inc.: *See—*
Krecic, Elda, 247,959, Cl. D11-83.000.
Mosher, James; Nidzgorski, Felix; and Eckhardt, George, to Coats & Clark, Inc. Packaging container for a zipper or the like. 247,955, 5-23-78, Cl. D9-250.000.
Mosher, James D.; Nidzgorski, Felix; and Eckhardt, George R., to Coats & Clark, Inc. Packaging container for a zipper. 247,954, 5-23-78, Cl. D9-250.000.
Naysmith, Kenneth D. Forehead cushion for face protective devices. 247,931, 5-23-78, Cl. D2-261.000.
Nidzgorski, Felix: *See—*
Mosher, James; Nidzgorski, Felix; and Eckhardt, George, 247,955, Cl. D9-250.000.
Mosher, James D.; Nidzgorski, Felix; and Eckhardt, George R., 247,954, Cl. D9-250.000.
Noll, Stanley Darwin, to Production Experts, Inc. Adjustable air inlet manifold for combined fireplace grate and heating unit. 247,947, 5-23-78, Cl. D23-94.000.
Nordlund, Olle, to E. J. Erikssons Knivfabrik. Combined hunting knife and sheath, or similar article. 247,970, 5-23-78, Cl. D22-1.000.
Olson, Richard Joseph, to Eastman Kodak Company. Microfilm reader or the like. 247,969, 5-23-78, Cl. D16-18.000.
Painter, David L.; and Minsky, Norman C., to Dart Industries Inc. Electric cooking base and vessel. 247,946, 5-23-78, Cl. D7-94.000.
Penguin Industries, Inc.: *See—*
Wortley, Austin M., Jr.; and MacLeod, Bruce H., 247,936, Cl. D4-09.000.
Production Experts, Inc.: *See—*
Noll, Stanley Darwin, 247,947, Cl. D23-94.000.
Quaker Oats Company, The: *See—*
Breneman, Jack L., 247,985, Cl. D34-15.0KK.
Quick Point Pencil Co., Inc.: *See—*
Lage, David P., 247,995, Cl. D87-8.000.
Rankin, Armand T. Floatable lounge chair or similar article. 247,938, 5-23-78, Cl. D6-38.000.
Regie Nationale des Usines Renault: *See—*
Tixier, Michel, 247,991, Cl. D48-32.00A.
Rehrig, Houston. Cart basket. 247,953, 5-23-78, Cl. D9-248.000.
Riedeman, James L. Terrarium. 247,960, 5-23-78, Cl. D11-145.000.
Sakaki, Nobuyuki, to Dunlop Limited. Tire. 247,961, 5-23-78, Cl. D12-142.000.
Saunders, Caryl H. Ripening bowl with cover. 247,945, 5-23-78, Cl. D7-17.000.
Schwartz, Lawrence B., to Acricite Company, Inc. Handbag. 247,994, 5-23-78, Cl. D87-3.00F.
Sebestik, Ladislav. Sole. 247,935, 5-23-78, Cl. D2-320.000.
Shell Oil Company: *See—*
Anderson, Victor F., 247,933, Cl. D2-285.000.
Anderson, Victor F., 247,934, Cl. D2-287.000.
Sieler, George Jerome. Portable voice amplifier. 247,966, 5-23-78, Cl. D14-32.000.
Sonca Industries, Limited: *See—*
Wong, Chung-Chee, 247,990, Cl. D48-24.00R.
Storm, William D. Fishing lure. 247,976, 5-23-78, Cl. D22-28.000.
Takeuchi, Tom; Boldt, Melvin H.; and Wojtowicz, Chester J., to Amana Refrigeration, Inc. Microwave oven. 247,948, 5-23-78, Cl. D7-128.000.
Thermograte, Inc.: *See—*
Bergstrom, Theodore R., 247,973, Cl. D23-94.000.
Thompson, Albert Norman. Spring member for use in curling brooms. 247,987, 5-23-78, Cl. D4-4.000.
Thornley, Gordon G. Control console for swimming pool guard system. 247,964, 5-23-78, Cl. D13-32.000.
Tillinghast, Raymond C.; and Grant, William M., to Gem, Incorporated. Mop mounting plate. 247,949, 5-23-78, Cl. D7-180.000.
Tixier, Michel, to Regie Nationale des Usines Renault. Lens for car rear signal light. 247,991, 5-23-78, Cl. D48-32.00A.
Tobin, William J., to Cal Industries, Inc. Combined liquid dispenser, container shroud and cupholder. 247,940, 5-23-78, Cl. D6-95.000.
Tomita, Hidetomo, to Tomy Kogyo Co., Inc. Toy telephone. 247,988, 5-23-78, Cl. D34-15.00C.
Tomy Kogyo Co., Inc.: *See—*
Tomita, Hidetomo, 247,988, Cl. D34-15.00C.
Turner, Eugene. Fish hook removal tool. 247,971, 5-23-78, Cl. D22-31.000.
Warhaftig, Stephen H. Tooth brush holder. 247,939, 5-23-78, Cl. D6-94.000.
Wheeler, Jack I. Dehumidifier. 247,974, 5-23-78, Cl. D23-146.000.
Win, Murray M., to Malcolite Corporation. Side panel for ceiling light fixtures. 247,989, 5-23-78, Cl. D48-16.00A.
Wistrand, John, to Clairol Incorporated. Dryer. 247,979, 5-23-78, Cl. D28-13.000.
Wistrand, John, to Clairol Incorporated. Dryer comb concentrator attachment. 247,980, 5-23-78, Cl. D28-18.000.
Wistrand, John, to Clairol Incorporated. Dryer stand. 247,981, 5-23-78, Cl. D28-73.000.
Wojtowicz, Chester J.: *See—*
Takeuchi, Tom; Boldt, Melvin H.; and Wojtowicz, Chester J., 247,948, Cl. D7-128.000.
Wong, Chung-Chee, to Sonca Industries, Limited. Lantern. 247,990, 5-23-78, Cl. D48-24.00R.
Wortley, Austin M., Jr.; and MacLeod, Bruce H., to Penguin Industries, Inc. Firearm barrel scrubber. 247,936, 5-23-78, Cl. D4-09.000.
Yates, Tom. Compass. 247,958, 5-23-78, Cl. D10-68.000.

CLASSIFICATION OF PATENTS

ISSUED MAY 23, 1978

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 3

27 4,090,264

CLASS 4

154 4,090,265
172.19 4,090,266
288 4,090,267

CLASS 5

327 R 4,090,268
343 4,090,269

CLASS 8

120 4,090,844
169 4,090,845

CLASS 9

2 A 4,090,270

CLASS 13

32 4,091,228
33 4,091,229

CLASS 15

243 4,090,271
250.36 4,090,272

CLASS 16

144 4,090,273
153 4,090,274

CLASS 17

24 4,090,275

CLASS 19

99 4,090,276
115 R 4,090,277

CLASS 23

230 B 4,090,846
230 R 4,090,847
253 R 4,090,848
253 TP 4,090,849
259 4,090,850
273 SP 4,090,851
288 F 4,090,852

CLASS 24

70 SK 4,090,278
205.11 F 4,090,279

CLASS 29

33 K 4,090,280
40 4,090,281
116 AD 4,090,282
159 R 4,090,283
159.3 4,090,284
401 F 4,090,285
454 4,090,286
568 4,090,287
570 4,090,288
571 4,090,289
596 4,090,290
623 4,090,292
623.1 4,090,291
628 4,090,293
4,090,294
789 4,090,295

CLASS 30

113.1 4,090,296
124 4,090,297
368 4,090,298

CLASS 32

14 A 4,090,299

CLASS 33

1 R 4,090,300
76 R 4,090,301
168 B 4,090,302
174 F 4,090,303
182 4,090,304
234 4,090,305
391 4,090,306

CLASS 34

9 4,090,307
32 4,090,308
58 4,090,309
4,090,310
92 4,090,312

CLASS 35

35 R 4,090,311
75 4,090,313

CLASS 37

124 4,090,314

CLASS 40

518 4,090,315

CLASS 42

70 F 4,090,316

CLASS 43

42.19 4,090,319
42.36 4,090,317
43.14 4,090,318

CLASS 44

51 4,090,853
73 4,090,854

CLASS 46

9 4,090,320
12 4,090,321
25 4,090,322
74 R 4,090,323
220 4,090,324

CLASS 47

9 4,090,325
12 4,090,326
4,090,327
4,090,328

CLASS 49

352 4,090,329

CLASS 51

123 G 4,090,330
134.5 R 4,090,331
163.2 4,090,332
336 4,090,333
427 4,090,334

CLASS 52

9 Re.29,635
20 Re.29,636
239 4,090,335
309.1 4,090,337
309.7 4,090,336
392 4,090,338
580 4,090,339
618 4,090,340

CLASS 53

21 R 4,090,341
23 4,090,342
27 4,090,343
28 4,090,344

CLASS 55

2 4,090,855
11 4,090,856
337 4,090,857

CLASS 56

10.5 4,090,345
13.6 4,090,346

CLASS 57

71 4,090,347
105 4,090,348

CLASS 58

12 4,090,349
23 BA Re.29,637
23 D 4,090,351
4,090,352
23 R 4,090,350
85.5 4,090,353
117 4,090,354
130 E 4,090,355
144 4,090,356

CLASS 59

85 4,090,357

CLASS 60

39.29 4,090,360
39.51 R 4,090,358
39.69 R 4,090,359
649 4,090,361
679 4,090,362

CLASS 61

31 4,090,363
39 4,090,364
41 A 4,090,365
69 R 4,090,366
91 4,090,367
93 4,090,368

CLASS 62

6 4,090,858
4,090,859
63 4,090,369
91 4,090,370
129 4,090,371
141 4,090,372
262 4,090,373
341 4,090,374

CLASS 64

21 4,090,375

CLASS 66

153 4,090,376
154 A 4,090,377

CLASS 69

6.5 4,090,378
29 4,090,878

CLASS 70

455 4,090,379
456 R 4,090,380

CLASS 71

78 4,090,860
90 4,090,861
92 4,090,863
98 4,090,862
4,090,864
108 4,090,866
118 4,090,865

CLASS 72

68 4,090,381
119 4,090,382
134 4,090,383
186 4,090,384
191 4,090,385
208 4,090,386
217 4,090,387
239 4,090,388
350 4,090,389
410 4,090,390
422 4,090,391

CLASS 73

1 B 4,090,393
19 4,090,398
37 4,090,394
40.5 R 4,090,395
46 4,090,396
73 4,090,397
88 B 4,090,400
88 F 4,090,399
91 4,090,401
104 4,090,402
4,090,403
119 A 4,090,404
151 Re.29,638
4,090,405
204 4,090,406
290 V 4,090,407
304 C 4,090,408
421.5 R 4,090,392

CLASS 74

128 4,090,409
414 4,090,410
471 XY 4,090,411
519 4,090,412
665 GB 4,090,413
733 4,090,414
769 4,090,415
785 4,090,416
864 4,090,417

CLASS 75

0.5 R 4,090,868
2 4,090,867
12 4,090,869
74 4,090,870
84.5 4,090,871
145 4,090,872
208 R 4,090,873
246 4,090,874
248 4,090,875

CLASS 76

84 4,090,418

CLASS 81

3.4 4,090,419
5.1 A 4,090,420
52.4 R 4,090,421

CLASS 82

1 C 4,090,422
2.5 4,090,423

CLASS 83

330 4,090,424
402 4,090,425

CLASS 84

1.26 4,090,426
291 4,090,427

CLASS 85

41 4,091,173

CLASS 90

6 4,090,428

CLASS 91

466 4,090,429

CLASS 92

71 4,090,430
92 4,090,431

CLASS 93

20 4,090,432
58.2 R 4,090,433

CLASS 96

1 R 4,090,876
27 E 4,090,877
49 4,090,879
86 R 4,090,880

CLASS 98

38 E 4,090,434
42 A 4,090,435
66 R 4,090,436
86 4,090,437

CLASS 99

441 4,090,438
494 4,090,439

CLASS 100

4 4,090,440
7 4,090,441

CLASS 101

111 4,090,442
123 4,090,443
415.1 4,090,444
425 4,090,445

CLASS 102

7.2 4,090,446
23 4,090,447
70.2 GA 4,090,448
70.2 P 4,090,449
76 P 4,090,450

CLASS 104

12 4,090,451
247 4,090,452
273 4,090,453

CLASS 105

182 R 4,090,454

CLASS 106

68 4,090,881
99 4,090,882
4,090,883
4,090,884
170 4,090,885
264 4,090,886
288 B 4,090,887
304 4,090,888

CLASS 110

232 4,090,455

CLASS 111

3 4,090,456
82 4,090,457

CLASS 114

20 R 4,090,458
67 A 4,090,459
74 A 4,090,460
107 4,090,461
293 4,090,462
294 4,090,463

CLASS 116

63 R 4,090,464
4,090,465
114 AE 4,090,466
129 T 4,090,467
132 R 4,090,468

CLASS 118

410 4,090,469

CLASS 119

1 4,090,470
14.51 4,090,471
20 4,090,472

CLASS 122

6 A 4,090,473
20 B 4,090,474
367 PF 4,090,476

CLASS 123

1 R 4,090,477
30 C 4,090,479
58 R 4,090,478
102 4,090,480
103 E 4,090,481
119 A 4,090,482
4,090,483
127 4,090,484
133 4,090,485
139 AW 4,090,486
140 MP 4,090,487
148 E 4,090,488

CLASS 125

13 R 4,090,489

CLASS 126

25 R 4,090,490
39 J 4,090,491
101 4,090,492
270 4,090,493
4,090,494
4,090,495
271 4,090,496
4,090,497
4,090,498
299 D 4,090,499
391 4,090,500

CLASS 128

2 A 4,090,502
2 H 4,090,501
2.05 G 4,090,503
2.05 R 4,090,504
2.06 G 4,090,505
11 4,090,506
66 4,090,507
80 C 4,090,508
142.5 4,090,509
146.6 4,090,510
147 4,090,511
173 H 4,090,512
212 4,090,513
214 F 4,090,514
284 4,090,515
287 4,090,516
303.1 4,090,517
349 B 4,090,518
419 D 4,090,519

CLASS 131

23 R 4,090,826
29 4,090,520
109 R 4,090,521

CLASS 132

112 4,090,522

CLASS 134

18 4,090,523

CLASS 137

68 R 4,090,524
171 4,090,525
209 4,090,526
215 4,090,527
344 4,090,528
516.29 4,090,529
563 4,090,530
624.12 4,090,531
624.15 4,090,532
627.5 4,090,533

CLASS 138

97 4,090,534

CLASS 139

434 4,090,535
452 4,090,536

CLASS 140

92.1 4,090,537

CLASS 141

100 4,090,538
198 4,090,539

CLASS 144

34 R 4,090,540

CLASS 148

11.5 A 4,090,889
12.7 C 4,090,890
28 4,090,891
103 4,090,892

CLASS 149

19.9 4,090,893
19.91 4,090,894
22 4,090,895

CLASS 150

1.7 4,090,542
.5 4,090,541
52 G 4,090,543

CLASS 151

14 R 4,090,544
28 4,090,545

CLASS 152

347 4,090,546
354 R 4,090,547

CLASS 156

51 4,090,896
73.1 4,090,897
73.5 4,090,898
79 4,090,899
85 4,090,900
96 4,090,901
177 4,090,902
211 4,090,903
215 4,090,904
218 4,090,905
244.27 4,090,906
345 4,090,907
380 4,090,908
414 4,090,909
430 4,090,910
499 4,090,911
502 4,090,912
523 4,090,914
560 4,090,913
628 4,090,915

CLASS 157

1.17 4,090,548

CLASS 159

9 A 4,090,916

CLASS 164

4 4,090,549
70 4,090,550
137 4,090,551
438 4,090,552
448 4,090,553

CLASS 165

1 4,090,554
76 4,090,555
78 4,090,556
110 4,090,557
155 4,090,558
179 4,090,559

CLASS 166

.6 4,090,560
292 4,090,561

304 4,090,562
307 4,090,563
314 4,090,564
315 4,090,565

CLASS 168

17 4,090,566

CLASS 169

53 4,090,567

CLASS 171

27 4,090,568

CLASS 172

59 4,090,569
116 4,090,570
169 4,090,571

CLASS 174

15 C 4,091,230
48 4,091,231
52 R 4,091,232
88 R 4,091,233

CLASS 175

16 4,090,572
45 4,090,573
106 4,090,574

CLASS 176

36 R 4,090,917
78 4,090,918

CLASS 177

210 EM 4,090,575
214 4,090,576

CLASS 178

18 4,091,234
23 R 4,091,235

CLASS 179

1 FS 4,091,236
1 SC 4,091,237
7.1 R 4,091,238
15 BF 4,091,239
4,091,240
15 BT 4,091,241
15.55 T 4,091,242
84 VF 4,091,243
158 R 4,091,244

CLASS 180

44 M 4,090,577
52 4,090,578
69 R 4,090,579
103 BF 4,090,580
140 4,090,581

CLASS 181

150 4,090,582
240 4,090,583

CLASS 182

5 4,090,584
47 4,090,585
204 4,090,586
206 4,090,587

CLASS 184

11 A 4,090,588

CLASS 185

40 R 4,090,589

CLASS 188

72.5 4,090,590
73.1 4,090,591
181 R 4,090,592

CLASS 190

44 4,090,593

CLASS 191

23 A 4,090,594

CLASS 192

17 R 4,090,595
58 B 4,090,596
85 AA 4,090,597
096 4,090,598

CLASS 195

63 4,090,919
127 4,090,920
4,090,921

CLASS 198

316 4,090,601
377 4,090,602
460 4,090,603
861 4,090,604

CLASS 200

19 R 4,091,245
50 B 4,091,246
67 G 4,091,247
83 P 4,091,249
84 C 4,091,250
144 B 4,091,248
146 AA 4,091,251

CLASS 203

48 4,090,922
51 4,090,923

CLASS 204

1 T 4,090,924
4,090,925
4,090,926
10 4,090,927
15 4,090,928
28 4,090,929
67 4,090,930
98 4,090,931
4,090,932
129 4,090,933
140 4,090,934
146 4,090,935
159.18 4,090,936
180 R 4,090,937
224 R 4,090,938
258 4,090,939
278 4,090,940
298 4,090,941

CLASS 206

110 4,090,605
223 4,090,606
410 4,090,659
424 4,090,607
4,090,608
444 4,090,609

CLASS 208

8 4,090,942
10 4,090,943
4,090,944
11 R 4,090,945
48 AA 4,090,946
56 4,090,947
74 4,090,948
78 4,090,949
89 4,090,950
91 4,090,951
139 4,090,952
177 4,090,953
206 4,090,954

CLASS 209

5 4,090,955
74 R 4,090,610
111.8 4,090,611
211 4,090,956

CLASS 210

54 4,090,957
4,090,958
58 4,090,959
63 Z 4,090,960
108 4,090,962
130 4,090,963
134 4,090,964
143 4,090,966
151 4,090,965

CLASS 211

13 4,090,612
69.5 4,090,613

CLASS 213

62 A 4,090,614
151 4,090,615

CLASS 214

1 BB 4,090,617
1 HH 4,090,616
6 M 4,090,618
16 B 4,090,620
16 R 4,090,619
16.1 ED 4,090,621
18 K 4,090,622
38 D 4,090,623
77 R 4,090,624
4,090,625
302 4,090,626
506 4,090,627
655 4,090,628

CLASS 215

214 4,090,629
320 4,090,630
329 4,090,631

CLASS 219

10.55 R 4,091,252
69 C 4,090,961
76.14 4,091,253
79 4,091,254
84 4,091,255
121 EB 4,091,257
121 L 4,091,256
125.12 4,091,258
137 R 4,091,259
149 4,091,260
301 4,091,261
345 4,091,262
377 4,091,263
469 4,091,264
501 4,091,265
504 4,091,266
527 Re.29,641
544 4,091,267

CLASS 220

4 R 4,090,632
6 4,090,633
258 4,090,635
302 4,090,634
307 4,090,636

CLASS 221

92 4,090,637
307 4,090,638

CLASS 222

43 4,090,639
52 4,090,640
70 4,090,475
4,090,641
94 4,090,642
146 HE 4,090,643
174 Re.29,639
180 4,090,644
193 4,090,645
326 4,090,646
543 4,090,647
570 4,090,648

CLASS 223

99 4,090,649

CLASS 224

5 W 4,090,650
7 E 4,090,651

CLASS 227

18 4,090,652
67 4,090,653

CLASS 228

40 4,090,654
103 4,090,655
119 4,090,657
180 R 4,090,656

CLASS 229

2.5 EC 4,090,658
43 4,090,660

CLASS 233

1 R 4,090,661

CLASS 235

98 B 4,091,269
419 4,091,270
4,091,271
424 4,091,268
493 4,090,662

CLASS 236

10 4,090,663
11 4,090,664

CLASS 238

86 4,090,665

CLASS 239

15 4,090,666
130 4,090,668

CLASS 241

8 4,090,669
23 4,090,670
29 4,090,671
221 4,090,674
261.1 4,090,672
275 4,090,673

CLASS 242

18 DD 4,090,676
47 4,090,675
47.01 4,090,677
107.4 A 4,090,678
186 4,090,679
195 4,090,680

CLASS 244

45 R 4,090,681
99 4,090,682
151 R 4,090,683
218 4,090,684

CLASS 246

125 4,090,685

CLASS 248

49 4,090,686

CLASS 249

60 4,090,687

CLASS 250

199 4,091,272
4,091,273
201 4,091,274
4,091,275
214 R 4,091,276
4,091,277
225 4,091,279
231 R 4,091,280
237 G 4,091,281
280 4,091,282
303 4,091,283
337 4,091,284
360 4,091,285
4,091,286
362 4,091,287
370 4,091,288
445 T 4,091,289

CLASS 251

25 4,090,688
129 4,091,348

CLASS 252

3 4,090,967
8.5 A 4,090,968
8.55 D 4,090,969
42.7 4,090,970
51.5 A 4,090,971
61 4,090,972
89 R 4,090,973
135 4,090,974
299 4,090,975
301.1 R 4,090,976
408 4,090,977
425.3 4,090,978
441 4,090,979
454 4,090,980
455 Z 4,090,981
465 4,090,982
501 4,090,983
511 4,090,984
522 4,090,985

CLASS 254

7 R 4,090,689
28 4,090,690
51 4,090,691
141 4,090,692
187.5 4,090,693

CLASS 256

13.1 4,090,694

CLASS 260

2.5 AC 4,090,988
2.5 AH 4,090,987
2.5 EP 4,090,986
2.5 N 4,091,022
5 4,090,989
18 PF 4,090,990
23 EM 4,090,991
29.6 AT 4,090,992
29.6 NR 4,090,993
31.8 R 4,090,994
38 4,090,995
40 R 4,090,996
47 UA 4,090,997
63 R 4,090,998
69 R 4,090,999
75 EP 4,091,001
75 NQ 4,091,000
75 S 4,091,002
112 R 4,091,003
153 4,091,004
191 4,091,021
293.63 4,091,024
294.8 F 4,091,025
294.9 Re.29,640
306.7 C 4,091,026
4,091,027
314.5 4,091,028
326.2 4,091,029
326.25 4,091,030
327 P 4,091,031
345.8 R 4,091,032
346.22 4,091,033
391 4,091,034
397.25 4,091,035
397.45 4,091,036
410.5 4,091,006
410.9 N 4,091,005
448 C 4,091,007
450 4,091,008
453 PH 4,091,009
465 D 4,091,010
4,091,011
465.1 4,091,012
508 4,091,013
512 R 4,091,014
520 B 4,091,015
544 C 4,091,016
544 D 4,091,017
562 R 4,091,018
585 R 4,091,019
586 C 4,091,020
609 F 4,091,037
645 4,091,042
653.7 4,091,043
668 C 4,091,044
677 A 4,091,045
680 R 4,091,046
836 4,091,047
4,091,048
4,091,049
837 R 4,091,050
879 4,091,052
880 B 4,091,051
4,091,053
886 4,091,054
900 4,091,055

CLASS 261

19 4,091,056

CLASS 264

1 4,091,057
11 4,091,058
28 4,091,059
40.1 4,091,060
40.5 4,091,061
85 4,091,062
94 4,091,063
174 4,091,064
177 F 4,091,065
182 4,091,066
222 4,091,067
274 4,091,068
328 4,091,069

CLASS 266

111 4,090,697
133 4,090,698
252 4,090,699

CLASS 267

45 4,090,700

CLASS 270

21 4,090,701

CLASS 271

108 4,090,702
233 4,090,703
246 4,090,704

CLASS 272

75 4,090,705
137 4,090,706

CLASS 273

29 A 4,090,707
55 R 4,090,708
72 A 4,090,709
75 4,090,710
80 R 4,090,711
85 R 4,090,712
86 B 4,090,713
101.1 4,090,714
141 A 4,090,715
232 4,090,716
249 4,090,717

CLASS 274

1 A 4,090,718

CLASS 277

125 4,090,719
140 4,090,720

CLASS 280

5 A 4,090,721
6 H 4,090,723
47.32 4,090,722
415 R 4,090,724
479 A 4,090,725

CLASS 285

229 4,090,726

CLASS 292

11 4,090,727

CLASS 293

71 R 4,090,728

CLASS 294

31.2 4,090,729
50.6 4,090,730

CLASS 296

28 C 4,090,731
97 B 4,090,733
97 C 4,090,732
146 4,090,734

CLASS 297

388 4,090,735

CLASS 299

30 4,090,736

CLASS 301

12 R 4,090,737
37 AT 4,090,744

CLASS 303

7 4,090,738
10 4,090,739
22 R 4,090,740
96 4,090,741

CLASS 307

88.3 4,091,290
95 4,091,291
130 4,091,292
205 4,091,293
221 D 4,091,278
229 4,091,295
292 4,091,296
353 4,091,297

CLASS 308

9 4,090,742
4,090,743
10 4,090,745
26 4,090,746
30 4,090,747
121 4,090,748
132 4,090,749
138 4,090,750
191 4,090,751

CLASS 310

52 4,091,298
71 4,091,299
154 4,091,300
270 4,091,301
339 4,091,302
343 4,091,303

CLASS 312

42 4,090,752
140 4,090,753
196 4,090,754
257 R 4,090,755
320 4,090,756
4,090,757

CLASS 313

174 4,091,304
220 4,091,305
409 4,091,306

CLASS 315

92 4,091,307
151 4,091,308
169 TV 4,091,309
344 4,091,310
382 4,091,311
383 4,091,312

CLASS 316

2 4,090,758

CLASS 318

227 4,091,294
369 4,091,317
439 4,091,313
464 4,091,314
603 4,091,315
696 4,091,316

CLASS 320

2 4,091,318
9 4,091,319
40 4,091,320

CLASS 323

19 4,091,321

CLASS 324

3 4,091,322
.5 AH 4,091,323
30 B 4,091,324
51 4,091,325
72 4,091,326
95 4,091,327

CLASS 325

37 4,091,328

CLASS 328

145 4,091,329

CLASS 329

107 4,091,330
110 4,091,331

CLASS 330

43 4,091,332
100 4,091,333
287 4,091,334

CLASS 331

1 A 4,091,335
94.5 P 4,091,336
101 4,091,337
116 R 4,091,338
117 R 4,091,339
132 4,091,340
4,091,341

CLASS 332

29 R 4,091,342

CLASS 333

10 4,091,343
71 4,091,345
73 S 4,091,344

CLASS 335

78 4,091,346
212 4,091,347

CLASS 336

192 4,091,349
208 4,091,350

CLASS 337

62 4,091,351
187 4,091,352
204 4,091,353
343 4,091,354

CLASS 338

286 4,091,355

CLASS 339

19 4,090,667
60 M 4,090,759
61 R 4,090,760
90 R 4,090,761
95 R 4,090,762
103 M 4,090,763
4,090,764
111 4,090,765
113 L 4,090,766
143 R 4,090,767
4,090,768
156 R 4,090,769
206 R 4,090,770
217 S 4,090,771
258 R 4,090,772

CLASS 340

3 T 4,091,356
5 R 4,091,357
7 R 4,091,358
146.3 H 4,091,394
166 R 4,091,359
4,091,360
168 R 4,091,361
227 R 4,091,363
237 S 4,091,364
243 4,091,365
258 A 4,091,367
258 R 4,091,366
259 4,091,368
262 4,091,369
272 4,091,370
274 R 4,091,371
282 4,091,372
311 4,091,373
324 AD 4,091,374
324 R 4,091,375
336 4,091,376
4,091,377
347 AD 4,091,378
4,091,379
4,091,381
347 DD 4,091,380
373 4,091,382
384 R 4,091,383
416 4,091,384

CLASS 343

8 4,091,385
713 4,091,386
754 4,091,387
872 4,091,388

CLASS 346

32 4,091,389
75 4,091,390
76 R 4,091,391
110 R 4,091,392
139 C 4,091,393

CLASS 350

1.6 4,090,773
6.4 4,090,774
50 4,090,775
96.12 4,090,776
96.15 4,090,777
96.20 4,090,778
255 4,090,780
285 4,090,781
355 4,090,779
357 4,090,782

CLASS 352

27 4,090,783
74 4,090,784

CLASS 353

57 4,090,785

CLASS 354

23 D 4,091,396
81 4,091,397
145 4,091,398
152 4,091,399
173 4,091,395
202 4,091,400
266 4,091,401
293 4,091,402
300 4,091,403
321 4,091,404

CLASS 355

4 4,090,786
14 4,090,787
71 4,090,788

CLASS 356

85 4,090,789
125 4,090,790
184 4,090,791
188 4,090,792
205 4,090,793
209 4,090,794
246 4,090,795

CLASS 357

23 4,091,405
54 4,091,406
4,091,407
56 4,091,408
68 4,091,409

CLASS 358

24 4,091,410
28 4,091,411
105 4,091,415
108 4,091,412
111 4,091,416
117 4,091,417
118 4,091,413
160 4,091,418
168 4,091,419
174 4,091,414
184 4,091,420
195 4,091,421
210 4,091,422
259 4,091,423
260 4,091,424

CLASS 360

38 4,091,425
74 4,091,426
101 4,091,427
104 4,091,428
110 4,091,429
135 4,091,454

CLASS 361

43 4,091,430
45 4,091,431
56 4,091,432
76 4,091,433
100 4,091,434
119 4,091,435
120 4,091,436
166 4,091,437
189 4,091,438
334 4,091,439
415 4,091,440

CLASS 362

1 4,091,441
61 4,091,442
156 4,091,443
374 4,091,444

CLASS 364

200 4,091,445
4,091,446
4,091,447
4,091,448
4,091,455
466 4,091,449
494 4,091,450
506 4,091,451
768 4,091,452
819 4,091,453
900 Re.29,642
4,091,456

CLASS 365

1 4,091,362
12 4,091,458
13 4,091,459
154 4,091,460
4,091,461

CLASS 366

17 4,091,462
76 4,090,695
298 4,091,463
304 4,091,457
327 4,090,696

CLASS 400

134 4,090,599
213 4,090,600

CLASS 403

24 4,090,796
157 4,090,797
171 4,090,798
401 4,090,799

CLASS 404

48 4,090,800

CLASS 407

113 4,090,801

CLASS 408

6 4,090,802
12 4,090,803
59 4,090,804
111 4,090,805
139 4,090,806
213 4,090,807
222 4,090,808

CLASS 415

163 4,090,809

CLASS 416

97 R 4,090,810
119 4,090,811
133 4,090,812
184 4,090,813

CLASS 417

178 4,090,814
203 4,090,815
371 4,090,816
462 4,090,817
473 4,090,818
499 4,090,819

CLASS 418

1 4,090,820
41 4,090,821
60 4,090,822
94 4,090,823
142 4,090,824
178 4,090,825

CLASS 423

41 4,091,070
121 4,091,071
213.5 4,091,072
226 4,091,073
235 4,091,074
242 4,091,075
244 4,091,076
298 4,091,077
299 4,091,078
328 4,091,079
406 4,091,081
413 4,091,082
415 R 4,091,083
491 4,091,084
555 4,091,080
625 4,091,085
648 R 4,091,086

CLASS 424

1 4,091,087
4,091,088
12 4,091,089
45 4,091,090
80 4,091,091
118 4,091,092
177 4,091,093
180 4,091,094
211 4,091,095
229 4,091,096
230 4,091,097
249 4,091,098
250 4,091,099
4,091,100
4,091,101
256 4,091,102
258 4,091,103
263 4,091,104
270 4,091,105
273 P 4,091,106
274 4,091,107
275 4,091,108
304 4,091,109
4,091,110
308 4,091,111
324 4,091,112
329 4,091,113
330 4,091,114
4,091,115

CLASS 425

64 4,090,827
71 4,090,828
73 4,090,829
117 4,090,830
119 4,090,831
391 4,090,832
451 4,090,833
470 4,090,834
505 4,090,835
574 4,090,836
588 4,090,837

CLASS 426

42 4,091,116
43 4,091,117
46 4,091,118
234 4,091,119
598 4,091,120
603 4,091,121

CLASS 427

44 4,091,122
4,091,123
58 4,091,124
96 4,091,125
262 4,091,126
304 4,091,127
4,091,128
314 4,091,148
345 4,091,129
358 4,091,130
386 4,091,131

CLASS 428

33 4,091,149
35 4,091,132
36 4,091,133
4,091,134
40 4,091,135
57 4,091,150
114 4,091,153
141 4,091,136
158 4,091,154
167 4,091,155
192 4,091,156
196 4,091,157
198 4,091,137
209 4,091,138
216 4,091,158
236 4,091,159
244 4,091,139
245 4,091,160
288 4,091,140
4,091,161
290 4,091,141
322 4,091,142
327 4,091,162
328 4,091,143
4,091,144
336 4,091,163
404 4,091,164
409 4,091,165
411 4,091,166
413 4,091,167
416 4,091,168
428 4,091,169
510 4,091,170
539 4,091,171
546 4,091,145
594 4,091,146
630 4,091,172
683 4,091,147

CLASS 429

27 4,091,174
40 4,091,175
4,091,176
42 4,091,177
60 4,091,178
84 4,091,179
4,091,180
94 4,091,181
101 4,091,182
104 4,091,151
105 4,091,152
138 4,091,183
139 4,091,184
144 4,091,185
157 4,091,186
159 4,091,187
174 4,091,188
176 4,091,190
181 4,091,189
194 4,091,191
211 4,091,192
219 4,091,193

CLASS 431

4 4,090,838
14 4,090,840
89 4,090,839

CLASS 432

60 4,090,841
115 4,090,842
197 4,090,843

CLASS 526

24 4,091,194
52 4,091,195
73 4,091,196
91 4,091,197
178 4,091,198
280 4,091,199

CLASS 528

495 4,091,200

CLASS 536

:0 4,091,202
11 4,091,204
17 4,091,201
26 4,091,203
85 4,091,205

CLASS 542

416 4,091,206
429 4,091,207
454 4,091,208

CLASS 544

16 4,091,209
18 4,091,210
21 4,091,211
27 4,091,212
4,091,213
30 4,091,214
4,091,215
4,091,216
4,091,217
106 4,091,218
117 4,091,219
121 4,091,220
147 4,091,221
148 4,091,222
378 4,091,023

CLASS 548

308 4,091,223
353 4,091,224

CLASS 560

9 4,091,227
20 4,091,225
122 4,091,226

CLASS 568

729 4,091,038
853 4,091,040
858 4,091,039
865 4,091,041

CLASSIFICATION OF DESIGNS

D2— 261 247,931
265 247,932
285 247,933
287 247,934
320 247,935
D4— 4 247,987
09 247,936
D6— 24 247,937
38 247,938
94 247,939
95 247,940
137 247,941
191 247,942
194 247,943
235 247,944
D7— 17 247,945
94 247,946
128 247,948
180 247,949
D8— 367 247,950
382 247,951
D9— 245 247,952
248 247,953
250 247,954
247,955
D10— 10 247,956
46 247,957
68 247,958
D11— 83 247,959
145 247,960
D12— 142 247,961
193 247,962
D13— 18 247,963
32 247,964
D14— 247,966
52 247,965
D15— 7 247,967
247,968
D16— 18 247,969
D22— 1 247,970
23 247,972
28 247,976
31 247,971
D23— 55 247,978
94 247,947
247,973
146 247,974
D24— 25 247,975
38 247,977
D28— 13 247,979
18 247,980
73 247,981
D29— 8 247,982
D34— 5 J 247,983
15 C 247,988
15 KK 247,985
15 LL 247,984
15 PT 247,986
D48— 16 A 247,989
24 R 247,990
32 A 247,991
D52— 4 R 247,992
D56— 1 B 247,993
D87— 3 F 247,994
8 247,995

GEOGRAPHICAL INDEX

OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

1 :	4,090,893		4,090,655		4,091,333		4,090,310		4,090,608		4,091,214
	4,091,412		4,090,680		4,091,344		4,090,319		4,090,622		4,091,271
4 :	4,090,285		4,090,691		4,091,362		4,090,395		4,090,645		4,091,323
	4,090,359		4,090,700		4,091,388		4,090,593		4,090,648	19 :	4,090,492
	4,090,468		4,090,707		4,091,408		4,090,708		4,090,690		4,090,604
	4,090,495		4,090,726		4,091,413		4,090,729		4,090,693		4,091,261
	4,090,583		4,090,737		4,091,424		4,090,769		4,090,705		4,091,381
	4,090,745		4,090,747		4,091,425		4,090,938		4,090,715	20 :	4,090,640
	4,090,947		4,090,764		4,091,432		4,090,941		4,090,719		4,090,665
	4,091,068		4,090,770		4,091,454		4,091,318		4,090,723	21 :	4,090,456
	4,091,070		4,090,771		4,091,458		4,091,350		4,090,724		4,090,803
	4,091,278		4,090,772		4,091,461		4,091,441		4,090,732		4,090,804
	4,091,279		4,090,779	8 :	4,090,399		4,091,453		4,090,733		4,090,898
	4,091,312		4,090,782		4,090,574	13 :	4,090,315		4,090,752		4,090,907
	4,091,321		4,090,793		4,090,625		4,090,570		4,090,754		4,090,954
	4,091,366		4,090,800		4,090,666		4,090,605		4,090,755		4,091,102
	4,091,445		4,090,807		4,090,780		4,090,647		4,090,785	22 :	4,090,392
	4,091,455		4,090,861		4,090,787		4,090,760		4,090,852		4,090,459
5 :	4,090,396		4,090,864		4,090,945		4,090,881		4,090,952		4,090,844
	4,090,522		4,090,865		4,091,275		4,090,884		4,090,978		4,091,009
	4,091,370		4,090,872		4,091,327		4,090,896		4,090,995		4,091,082
6 :	4,090,267		4,090,878		4,091,364		4,091,386		4,090,997		4,091,442
	4,090,273		4,090,894		4,091,392	15 :	4,090,466		4,091,032	23 :	4,091,353
	4,090,299		4,090,908	9 :	4,090,271		4,090,528		4,091,076	24 :	4,090,291
	4,090,303		4,090,914		4,090,286	16 :	4,090,390		4,091,142		4,090,309
	4,090,311		4,090,916		4,090,420	17 :	4,090,269		4,091,232		4,090,317
	4,090,333		4,090,928		4,090,427		4,090,274		4,091,247		4,090,356
	4,090,351		4,090,966		4,090,434		4,090,313		4,091,288		4,090,471
	4,090,362		4,090,976		4,090,455		4,090,314		4,091,313		4,090,789
	4,090,370		4,091,040		4,090,531		4,090,318		4,091,317		4,090,811
	4,090,384		4,091,057		4,090,762		4,090,334		4,091,336		4,090,812
	4,090,402		4,091,062		4,090,830		4,090,336		4,091,343		4,090,935
	4,090,406		4,091,072		4,090,972		4,090,358		4,091,363		4,091,079
	4,090,413		4,091,084		4,090,988		4,090,374		4,091,402		4,091,200
	4,090,439		4,091,087		4,091,069		4,090,379		4,091,410		4,091,325
	4,090,458		4,091,125		4,091,185		4,090,391		4,091,418		4,091,326
	4,090,475		4,091,132		4,091,207		4,090,414		4,091,419	25 :	4,090,272
	4,090,477		4,091,160		4,091,223		4,090,415		4,091,421		4,090,288
	4,090,490		4,091,166		4,091,224		4,090,453	18 :	Re.29,642		4,090,292
	4,090,491		4,091,192		4,091,242		4,090,467		4,090,304		4,090,301
	4,090,498		4,091,221		4,091,273		4,090,494		4,090,348		4,090,305
	4,090,500		4,091,230		4,091,274		4,090,515		4,090,580		4,090,385
	4,090,509		4,091,233		4,091,328		4,090,516		4,090,596		4,090,520
	4,090,532		4,091,234		4,091,371		4,090,518		4,090,614		4,090,543
	4,090,544		4,091,237		4,091,431		4,090,526		4,090,641		4,090,643
	4,090,562		4,091,256	10 :	4,090,566		4,090,534		4,090,756		4,090,767
	4,090,567		4,091,265		4,090,887		4,090,540		4,090,757		4,090,768
	4,090,568		4,091,270		4,090,950		4,090,541		4,090,763		4,090,784
	4,090,577		4,091,280		4,090,989		4,090,545		4,090,797		4,090,790
	4,090,587		4,091,306		4,091,010		4,090,579		4,090,817		4,090,834
	4,090,606		4,091,310		4,091,065		4,090,598		4,091,029		4,090,838
	4,090,609		4,091,330		4,091,137		4,090,601		4,091,096		4,090,897
	4,090,636		4,091,332	12 :	4,090,306		4,090,607		4,091,120		4,090,904

4,090,926
4,090,975
4,090,982
4,091,152
4,091,188
4,091,264
4,091,267
4,091,276
4,091,316
4,091,355
4,091,397
4,091,400
26 : Re.29,635
Re.29,641
4,090,365
4,090,417
4,090,425
4,090,436
4,090,438
4,090,480
4,090,524
4,090,592
4,090,635
4,090,651
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4,090,738
4,090,766
4,090,874
4,090,889
4,090,924
4,090,943
4,091,011
4,091,048
4,091,049
4,091,130
4,091,151
4,091,173
4,091,190
4,091,201
4,091,204
27 : 4,090,662
4,090,663
4,090,776
4,090,877
4,090,936
4,090,964
4,090,974
4,091,150
4,091,309
28 : 4,090,326
4,090,327
4,090,465
29 : 4,090,581
4,090,616
4,090,686
4,090,689
4,090,731
4,090,749
4,091,019
4,091,038
4,091,044
4,091,077
4,091,121
4,091,184
32 : 4,090,586
33 : 4,090,833
34 : 4,090,335
4,090,341
4,090,361
4,090,380
4,090,400
4,090,462
4,090,582
4,090,632

4,090,649
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4,090,713
4,090,718
4,090,736
4,090,758
4,090,765
4,090,777
4,090,821
4,090,822
4,090,829
4,090,843
4,090,850
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4,090,895
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4,090,934
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4,090,949
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4,091,018
4,091,020
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4,091,030
4,091,036
4,091,042
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4,091,106
4,091,127
4,091,133
4,091,136
4,091,144
4,091,194
4,091,216
4,091,229
4,091,231
4,091,238
4,091,243
4,091,250
4,091,290
4,091,304
4,091,334
4,091,352
4,091,360
4,091,365
4,091,379
4,091,387
4,091,406
4,091,407
4,091,409
4,091,415
4,091,430
4,091,452
36 : Re.29,639
4,090,289
4,090,312
4,090,320
4,090,347
4,090,372
4,090,373

4,090,412
4,090,419
4,090,426
4,090,449
4,090,461
4,090,464
4,090,474
4,090,501
4,090,504
4,090,506
4,090,512
4,090,530
4,090,548
4,090,585
4,090,588
4,090,613
4,090,615
4,090,646
4,090,650
4,090,657
4,090,660
4,090,704
4,090,706
4,090,712
4,090,727
4,090,744
4,090,786
4,090,810
4,090,846
4,090,849
4,090,879
4,090,880
4,090,900
4,090,910
4,090,915
4,090,918
4,090,925
4,090,959
4,090,960
4,090,967
4,091,031
4,091,041
4,091,067
4,091,103
4,091,146
4,091,182
4,091,187
4,091,193
4,091,213
4,091,257
4,091,260
4,091,292
4,091,298
4,091,305
4,091,311
4,091,324
4,091,342
4,091,361
4,091,383
4,091,390
4,091,417
4,091,422
4,091,435
4,091,439
37 : 4,090,268
4,090,308
4,090,424
4,090,493
4,090,508
4,090,550
4,090,710
4,091,004
4,091,063
4,091,100
4,091,112

4,091,149
4,091,170
38 : 4,090,411
4,090,624
39 : 4,090,281
4,090,284
4,090,290
4,090,295
4,090,296
4,090,298
4,090,302
4,090,322
4,090,332
4,090,337
4,090,342
4,090,388
4,090,394
4,090,444
4,090,485
4,090,539
4,090,557
4,090,584
4,090,612
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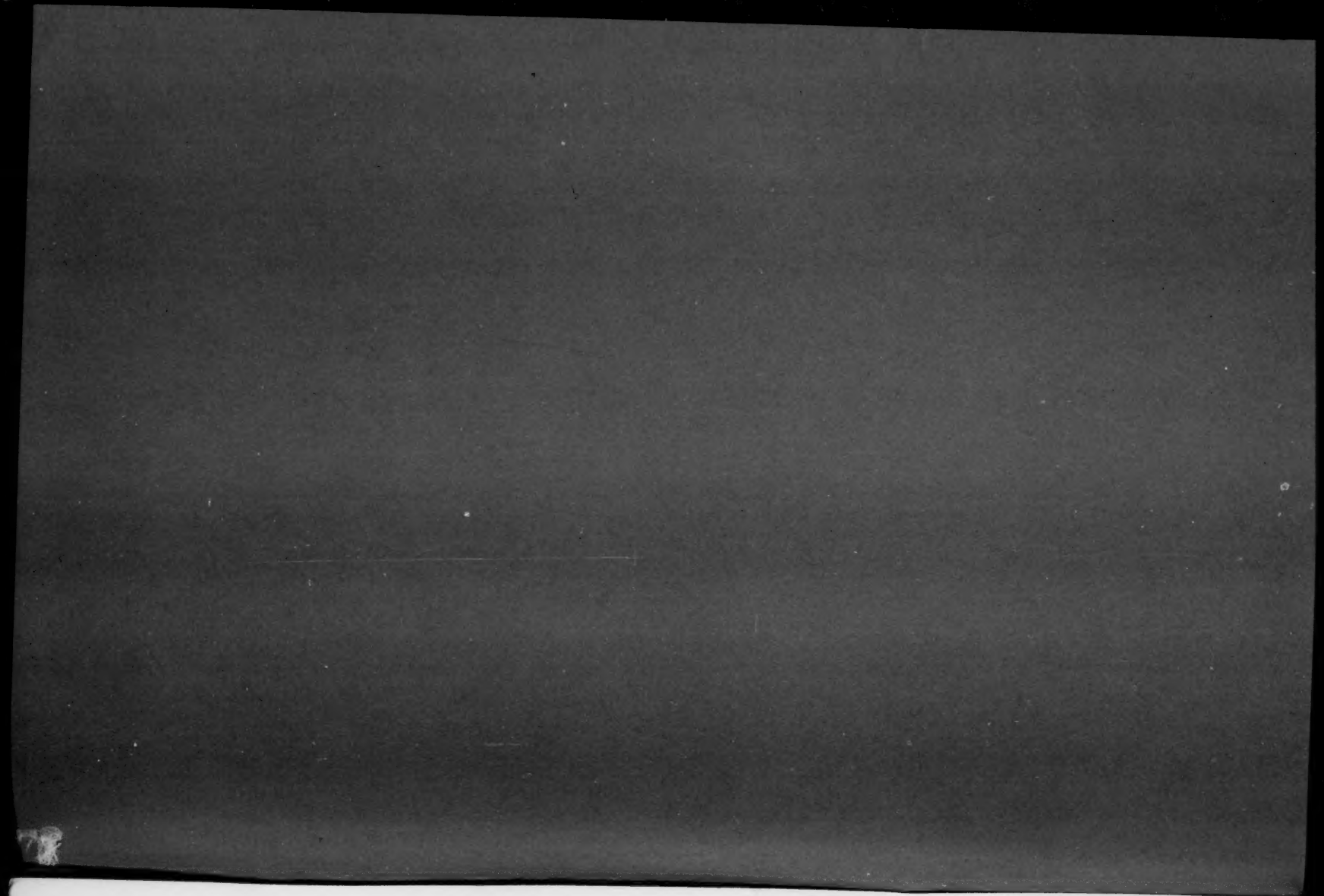

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Juanita M. Kreps, *Secretary*

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Lutrelle F. Parker, *Acting Commissioner*